



PSMA Overview 2023

Our Mission

To integrate power industry resources to profitably serve the needs of users, producers, industry stakeholders and all PSMA members.

i.e. to add value to our members and stakeholders as outlined by our purpose

- Improve members' knowledge of [PE] technological and other related developments;***
- Provide focused technical forums for power industry stakeholders to address industry challenges and develop collaborative, pragmatic, application-specific insights to drive solutions;***
- Educate the entire [ecosystem] as to the importance of PE and paths to growing PE's role in relevant applications***

Our Committees – It's How We Work

Twelve Active Committees/Forums



Safety & Compliance



Energy Harvesting



Semiconductor



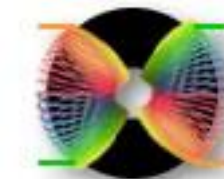
Transportation Electronics



Capacitor



Energy Management



Magnetics



Packaging & Manufacturing



Education



Energy Storage



Power Technology Roadmap



Reliability

A power sources industry ecosystem for the benefit of stakeholders

BENEFITS

*Progress
Enhance
Educate
Inform
Guide
Connect
Publish
Solve*



STAKEHOLDERS

*Manufacturers
Developers
Suppliers
Educators
Integrators
Users
Funders
Regulators*

Vision 2022-2025

The 4 pillars for sustenance and smart growth

- Continue delivering impactful outputs
- Become more applications and problem-solving oriented
- Define and integrate metrics to monitor the parameters that matter
- Engage more with stakeholders to solve the power industry challenges that matter most to them



Vision 2022-2025

The 4 pillars for sustenance and smart growth

- Continue delivering impactful outputs
- Become more applications and problem-solving oriented
- Define and integrate metrics to monitor the parameters that matter
- Engage more with stakeholders to solve the power industry challenges that matter most to them



Delivering impactful outputs

- Conferences and workshops
 - Cater for virtual and hybrid events
 - Adding in more educational & PTR webinars
- Biennial/triennial PTR (power technology roadmap)
 - Sharing Latest Technologies
 - Defining Expected Trends
- Technical reports
 - Exploring ideas via our committees.
 - Recent publications were on reliability and energy harvesting
- Applications – energy efficiency, reliability, energy harvesting, storage, packaging
- Problem solving
 - Using surveys and feedback (various formats) on events and issues to determine where we can add value – and then doing so!



Conferences, Workshops



Capacitor Forum



Capacitor Info & Resources
for the Power Electronics Industry.

Magnetics Forum



Magnetics Info & Resources
for the Power Electronics Industry.

PSMA Industry Sessions

e.g. Semiconductor, Energy harvesting,
Energy storage, Packaging, Marketing



2022 PSMA Vehicle Electrification Workshop
– The Latest Trends and Technologies –
Tuesdays September 13 & September 20, 9AM CDT, Virtual



Co-sponsored



Where are we going?

- **More towards addressing applications and solving industry problems**
e.g. Energy Storage, IoT, Transportation, Better Facts and Information
- **What combinations of technologies and application knowledge are needed?**
- **Building more external links with other associations**
 - Packaging, manufacturing, electronics, etc.
 - Workshops, roadmaps, newsletters, cross-promotions, etc.



Strategic Collaborations – Friends of PSMA

- EPSMA reliability publication
- Collaborative educational webinar series (softer skills)
- Collaborative Support For Conferences and Workshops
- PSMA PE session at IPC APEX2021
- Co-developing new IPC FW standard
- Strategic discussions on a federated roadmap methodology
- CPSSC engagement
- We co-sponsor events
- Great synergies being realized via guests from friends at committees
- Annual friends in person lunch/meeting at APEC
- Friends regularly invited to publish features in our quarterly newsletter and present at our AGM



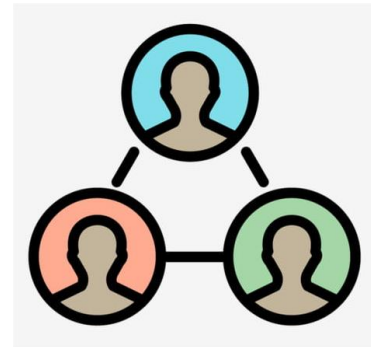
Some of our Success Stories 2021



- **Creation of new Energy Storage Committee**
- **17 webinars with typ. ~175 attendance??**
- **Energy harvesting white paper release**
- **Hosted/sponsored various workshops:**
 - **Magnetics Workshops**
 - **Capacitor Workshops**
 - **3D-PEIM**
 - **PwrSoc**
 - **WiPDA**
 - **IWIPP corridor event**
- **APEC sponsorship and participation**

PSMA membership benefits

- **NETWORKING:** The opportunity to meet and interact with your counterparts in other companies on an on-going basis.
- **VALUABLE INFORMATION:** Members enjoy access to information in the Members Only area of the Web site. Members also receive invitations to upcoming Webinars and Workshops.
- **INVOLVEMENT:** Based on the interests of committee members, members plan and organize APEC Industry Sessions, Webinars, Workshops and Conferences.
- **PARTICIPATION:** Members participate in committees, workgroups and studies to derive a better understanding of market trends, industry trends and better operational procedures to improve performance.
- **DISCOUNTS:** Members receive discounts on registration fees for attending APEC and other PSMA-sponsored events.
- **FINDING TRENDS:** Increase awareness and knowledge of trends and factors that can impact your company.
- **COMPANY PROFILE:** Listing of your company's profile on the PSMA website with a hyperlink directly to your company website.
- **PSMA PUBLICATIONS:** Regular members receive one copy of all new PSMA publications and reports with discounts for additional copies. Affiliate members may purchase the publications and reports at the member discount price.
- **BENCHMARKING:** Improve the operation of your company by participating in benchmarking studies with other companies in your industry.
- **PSMA NEWSLETTER:** Receive "Update," the quarterly newsletter of the PSMA, with information on activities in the industry and upcoming events. You may also contribute articles for publication in the "Update."
- **MEMBER COMPANY SPOTLIGHT BANNER:** Feature your company's products on the PSMA Home Page



We are a non profit volunteer-led organization with a mission to serve and nurture the PE community

Some Member Companies



Come join us

Regular Members - Manufacturers of power sources and conversion equipment, power semiconductors, power management ICs, passive devices, packaging and other components.

- Annual Dues \$1425

Affiliate Members - Organizations involved in the power industry, including Manufacturer's Representatives, Distributors, Advertising, Marketing, Consulting and Publications.

- Annual Dues \$190

Affiliate - Education Members - Individuals, Universities and other organizations involved in education or instruction in power subjects.

- Annual Dues \$190, Dues may be waived for qualified persons, institutions or companies.

Learn more and fill out a membership application at

<http://www.pσμα.com/membership/joining-information>

Thank you!

Suggestions for collaboration welcome

www.pσμα.com

power@spma.com

Linked in...

Twitter...

Optional extra slides

Our Committees

Committees Slides to Follow



Safety & Compliance



Energy Harvesting



Semiconductor



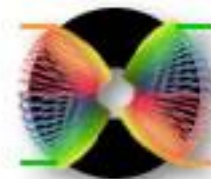
Transportation Electronics



Capacitor



Energy Management



Magnetics



Packaging & Manufacturing



Education



Energy Storage



Power Technology Roadmap



Reliability



Transportation Electronics Committee

- **Transportation Electronics covers a vast and dramatically growing industry, from powertrain, to sensors, to connectivity with the power grid. We focus on component and packaging trends in electronics for transportation applications.**
- **The PSMA Transportation Electronics Committee strives to be a part of the entire community. Our membership includes OEMs, Tier 1s, Tier 2s, and academia to ensure that we are aware of all of the latest technologies and trends. We then share them with the industry via, Workshops, Industry Sessions, and input into the PSMA PTR (Roadmap).**
- **Workshop – The PSMA Transportation Electronics Committee will be offering a 2 session Vehicle Electrification Workshop. We are partnering with ITEC to ensure a vast audience.**

Transportation Electronics Committee

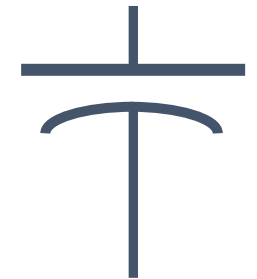


- **Transportation Industry Sessions are one of the most popular at APEC. We always have the best and brightest presenters to offer leading edge technologies and trends.**
- **Our support of the PTR (PSMA Roadmap), is continuous, projecting the trends and leading technologies that will affect the industry in the coming years.**
- **The PSMA Transportation Electronics Committee is growing to become the premiere group of manufacturers and designers in the industry...**

Energy Storage Committee



- Provide members and other interested parties with a forum to discuss market and technology trends in the broad area of energy storage and its application. Energy storage for power systems comes in many forms, such as electrochemical, molecular (like hydrogen), thermal, mechanical, and combinations of technologies. Applications can include primary, backup, or supplemental power in all types of power systems:
 - Batteries and Battery Systems
 - Ultracapacitors
 - Hydrogen
 - Energy Storage for Grid Enhancement and Renewables
 - Energy Storage in Transportation
 - Battery Management
 - Recycling
- Membership includes manufacturers, users, and researchers
 - ~35 members from 4 continents
- Sponsor of APEC Industry Sessions



Key Output Energy Storage – APEC Industry Sessions



- **APEC Industry Sessions offer typical topics such as:**
 - Trends in hydrogen production and storage
 - Energy storage needs for the IoT
 - Advanced battery technologies
 - Battery Management Systems (BMS)
 - Ultracapacitors
 - Power conversion for the energy storage to grid interface
 - Trends in advanced energy storage
 - Control of Distributed Energy Storage Systems for Energy Communities

Industry Education Committee



- **Attract and Grow Students into Power Electronics**
- **Attract and Grow Young Professionals into Power Electronics**
- **Help diversify the Power Electronics Industry**
- **APEC Student Support**
- **Mentoring**
- **Partnering with Other Organizations (PELS, IPC, etc.)**
- **Internship Opportunities**
- **Networking**
- **Education to the Industry – Various education webinars (Recom EMC, YP Seminar Series, etc.)**



Outputs

- **YP Seminar Series**
- **IFEC Support – financial and mentoring**
- **PTR and Other Special Projects**
- **Workshops**
 - Opportunities to present and engage
 - Deferred Proceedings available on PSMA website
- **Outreach at Conferences, etc.**
 - PELS/IAS YP event, WiE breakfast, etc.
- **“Elevator Pitch” crafting**
- **Resources (books/publications/white papers/application notes, etc.)**
- **APEC Industry Sessions**



Packaging and Manufacturing Committee

Our Mission

To provide opportunities to educate and provide information exchange about integrating design, packaging and manufacturing of Power Sources

Committee Overview

- 25 Active Committee Members
- 10-15 participants at each meeting
- Majority of committee activity revolves around organizing the following events
 - APEC Industry Session on Packaging and Manufacturing Technology
 - PwrSoC Workshop – (Power Supply on a Chip). Held every two years to focus on latest technology innovations to create a complete power source on a chip (actives and passives)
 - 3D-PEIM Symposium. Held every two years its focus is providing an in-person Symposium on 3D Packaging and Electronics, Integrated with Manufacturing (3D-PEIM). Emphasis is on mid power levels 5-500W.
 - IWIPP – International Workshop on Integrated Power Packaging. Held every two years its focus is similar to 3D-PEIM except at higher power levels utilizing wide bandgap devices.
- APEC 2022 Industry Session
- IWIPP August 24-26, 2022



Energy Management Committee



Background

Energy is one of the most critical aspects of global progress and societal development. Concerns about carbon emissions, scarce resources, and economical, efficient use of energy drive the need to increase sustainability. Despite impressive energy savings over the last few decades, we still have a long way to go, and efficient energy management plays a key part.

Mission

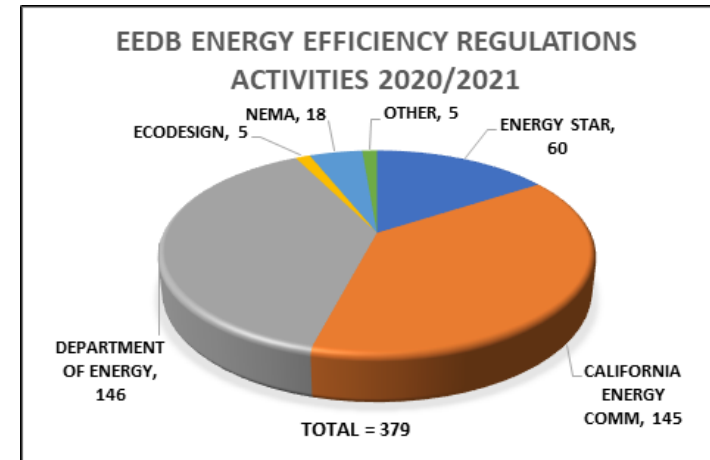
The mission of the Energy Management Technical Committee is to serve the needs of manufacturers, government policymakers, and industry standards organizations to provide education, support, and recommendations in matters regarding the energy efficiency of power supplies and system power architectures (no-load, standby, and active-on) with, as a primary goal, the establishment of a consistent global standard for energy efficiency.

Energy Management Committee

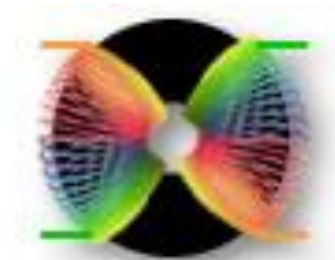


Focus areas

- Maintaining databases with the most recent information on energy efficiency standards for appliances, electronic power supplies, and motor drives, both existing and evolving, from government and regulatory organizations worldwide
- Organizing presentations on power electronics and technologies applicable to Distributed Energy Resources (DER), including wind generators, photovoltaic systems, fuel cells, micro-inverters, energy recovery, and energy storage systems
- Informing stakeholders on the status, trends, and issues related to alternative energy products and system applications as well as emerging technologies and markets for alternative energy sources
- Facilitating cooperation between PSMA and manufacturers, industry standards organizations, and government policymakers on matters regarding energy efficiency and management
- Encouraging PSMA participation in international and domestic conferences and technical workshops, for example, by sponsoring industry sessions and webinars

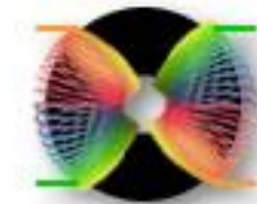


Magnetics Committee



- **Magnetics are everywhere**
- **Magnetics functions will always be needed but need to be transparent compared to other components**
- **Special projects**
 - Past: Core Loss Studies PSMA funded
 - Future projects – sponsor/partner funded
- **Webinars**
- **Design checklist**
- **Originator of components workshop**
 - Seven annual workshops 2016 thru 2022
 - Presentations are available on PSMA website
- **Longtime Sponsors of APEC Industry Sessions –**
 - presentations + demos

Power Magnetics at High Frequency Workshop Workshop



- Focus on current technology challenges
 - “... Largest gathering of magnetics experts in one setting ...” to exchange design experience and thoughts for the future
 - Inaugural Event Held March 2016 APEC Long Beach CA
 - Financial sponsor: PSMA
 - Technical Sponsor: PELS TC2
 - Balance of presentations from industry and research/academia
 - 120 attendees from industry and research/academia
 - Attendance range 100 – 180 over first 6 annual workshops
 - Lecture presentations, technology demonstrations, panel discussions, rap sessions
 - Annual workshop in conjunction with APEC
- <https://www.psma.com/technical-forums/magnetics/workshop>



Capacitor Committee



- *The PSMA Capacitors Committee is a group of volunteers knowledgeable about capacitors and power electronics. The aim of the group is to support the power electronics capacitor industry. The committee is involved in capacitor design papers, education, and design tools.*
- Capacitors are the most widely used passive component in most applications
- With so many technologies, and new materials, Capacitors are constantly evolving
- The PSMA Capacitor Committee strives to communicate and educate the industry to this evolution
- The Capacitor Committee uses Webinars, Workshops, Industry Sessions (at APEC), and articles in the PSMA Power Technical Roadmap to achieve this communication
- Webinars – There are several Webinars that have been offered. The most popular is a 4 part series called Capacitor Fundamentals 101 – 401.
- Workshops – we have offered an annual workshop just prior to APEC. This all day event is paired with a Magnetics Workshop and includes demonstrations and round table discussions in addition to the workshop discussions.

Capacitor Committee



The PSMA Capacitor Committee Annual Workshop aligned with APEC has a mission to educate the attendees on capacitor trends, technologies, and innovations. Wherever and whenever applications need energy, Capacitors are at the spotlight, and as energy moves the world it is incumbent for everyone to keep their finger on the pulse of capacitor issues. PSMA's Capacitor Committee is committed to present the best material available to meet the industry's needs.

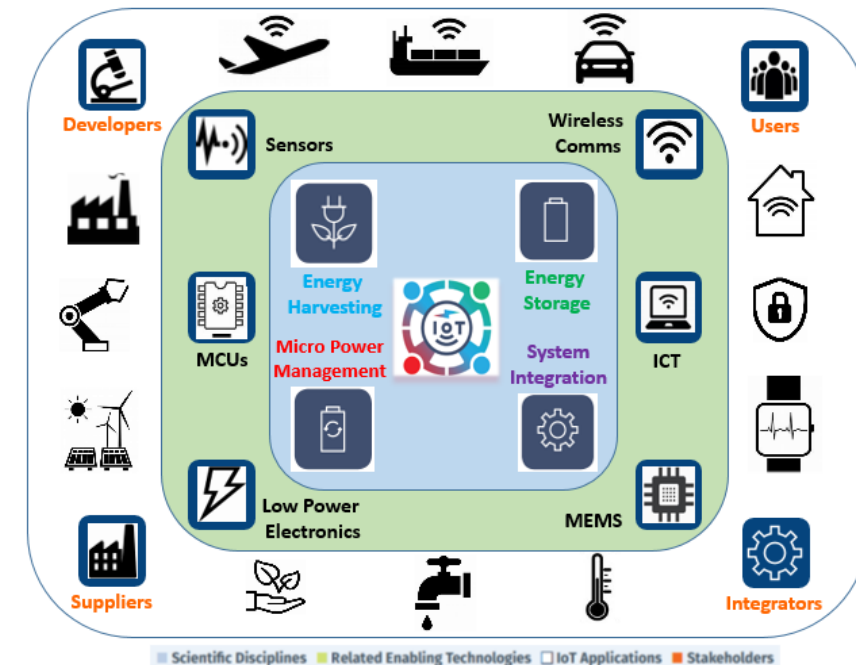
- **Capacitor Industry Sessions** are always popular at APEC, and are one of the top 5 sessions offered annually.
- Our support of the PTR (PSMA Roadmap), is continuous, projecting the trends and leading technologies that will affect the industry in the coming years.
- The PSMA Capacitor Committee is the premiere group of manufacturers and designers in the industry...

Energy Harvesting Committee



"Powering the Internet of Things"

- Building an Ecosystem of Collaborators
- Identifying Challenges & Opportunities in the 1 Trillion Sensor Economy
- Solving the Battery Life Problem for Wireless Sensors
- Contributors to 'Emerging Applications section' of the PTR
- Key Contributor to Other Roadmaps, e.g. EnABLES Position Paper, IEEE HIR, EU ECS-SRIA
- Key Publication – “EH for a Green IoT” White Paper
 - ✓ SECTION 1. State-of-The-Art from the Perspective of the User
 - ✓ SECTION 2. Developing for a Use Case
 - ✓ SECTION 3. Key Missing Elements for Industrial Adoption
 - ✓ SECTION 4. Key Advantages
 - ✓ SECTION 5. Innovation & Future Research
- Key Publication – “Powering the IoT” Cover Story
- Originators of Biennial EnerHarv Workshop & Power IoT Ecosystem
- Longtime Sponsors of APEC Industry Sessions –
 - presentations + demos
- ~50 Members from Four Continents



Key Output – EnerHarv Workshop



**EnerHarv
2022**

- Unique focal point for experts & users of energy harvesting & related technologies to share knowledge, best practices, roadmaps, experiences & provide opportunities for collaboration
- Inaugural Event Held in Cork, Ireland
 - Co-sponsored by IEEE, EnABLES, CPSS, CONNECT
 - ~85 attendees from industry and academia
 - Presentations, demos, panel sessions, networking
 - A clear gap and hunger for an event like this
- Most Recently EnerHarv Held in Raleigh, NC, USA
 - Hosted by ASSIST Research Center @ NCSU
 - Strong Workshop Committee (~30 folks) & keynote lineup
 - Successful format for inaugural EnerHarv retained
 - Ecosystem expanding
 - e.g. more software, business models and device packaging
 - Fostering synergies between research groups and industry associations

<http://www.EnerHarv.com/>



IMAGE CREDIT: B. Zahnstecher and M. Hayes, "International Workshop Fosters Energy Harvesting Ecosystem [Society News]," in IEEE Power Electronics Magazine, vol. 5, no. 4, pp. 72-73, Dec. 2018.

