



Power Sources Manufacturers Association



BUILD ELECTRONICS BETTER

## *"Building Synergies in Power Electronics"*

(Wisdom Wednesday Webinar Series)

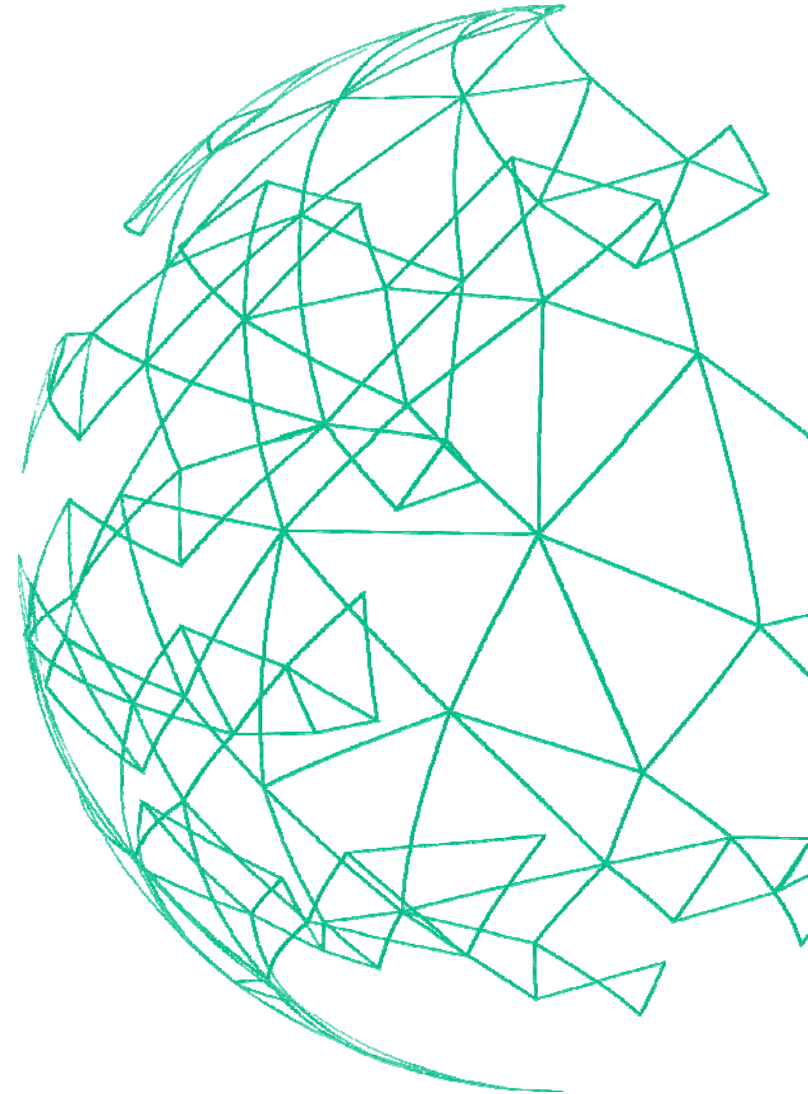
**Brian Zahnstecher, *Director*, PSMA**

*Co-chair*, Energy Harvesting Committee

*Co-chair*, Reliability Committee

IEEE Senior Member

*Principal*, PowerRox ([bz@powerrox.com](mailto:bz@powerrox.com))



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Wednesday, April 8, 2020

# Overview

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- ⚡ An Introduction to PSMA
- ⚡ Key Markets/Drives of Focus
- ⚡ Overlaps/Gaps Between PSMA & IPC
- ⚡ Synergistic Opportunities Between PSMA & IPC
- ⚡ Summary / Q&A

# An Introduction to PSMA

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## Purpose

- "...*enhance the stature and reputation of its members and their products, improve their knowledge of technological and other developments related to power sources, and educate the entire electronics industry, plus academia, as well as government and industry agencies as to the importance of, and relevant applications for, all types of power sources and conversion devices.*"

# An Introduction to PSMA

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## **⚡ Mission**

- *"To integrate the resources of the power sources industry to more effectively and profitably serve the needs of the power sources users, providers and PSMA members."*

## **⚡ Established 1985, Based in Mendham, NJ**

- A 501(c)(6) Nonprofit (incorporated in CA)
- An International Organization

**HAPPY 35<sup>TH</sup>  
ANNIVERSARY!!!**

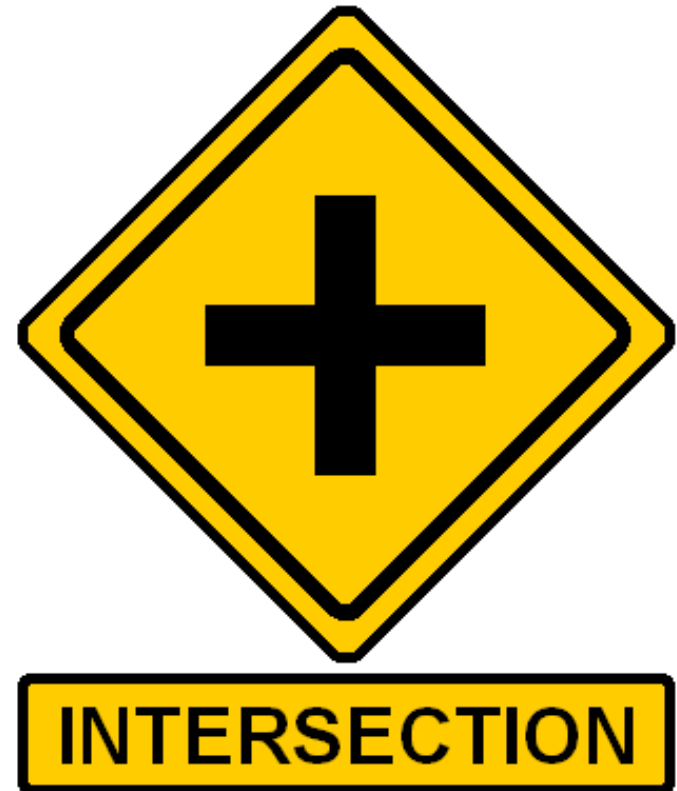


# An Introduction to PSMA

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## **P** More Than Energy Efficiency

- All Roads Lead to Power
  - Crossroads of the Electronics Industry
- Key Enabler
  - Technical
  - Economical
  - Business



# An Introduction to PSMA

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## **P High-Impact Industry Participation**

- Facilitate Communication/Terminology
- Finger on Pulse of Power Electronics
- Innovators & Driving Force Behind Applied Power Electronics Conference (APEC)
- Liaisons Between Users, Academia, and Government
- Special Studies



# An Introduction to PSMA

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## Tangible Outputs

- Technical Forums
- Workshops / Conferences
- Webinars
- Publications

# An Introduction to PSMA

## ⚡ Technical Forums



Capacitor



Education



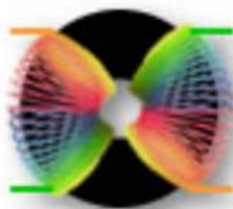
Energy Harvesting



Energy Management



Lead-Free



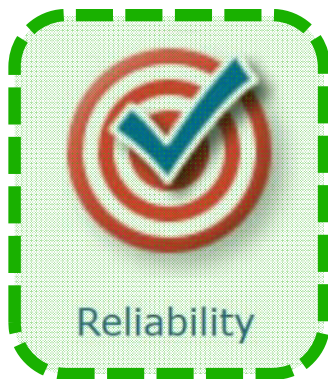
Magnetics



Packaging & Manufacturing



Power Technology Roadmap



Reliability



Safety & Compliance



Semiconductor



Transportation PowerElectronics

# An Introduction to PSMA

## Workshops / Conferences



The 7th Workshop on Wide Bandgap Power Devices and Applications (WiPDA 2019)



中国电源学会第二十三届学术年会

The 23<sup>rd</sup> China Power Supply Society Conference (CPSSC'2019)



**EnerHarv 2020**

Brought to you by PSMA



International Energy Harvesting Workshop, [www.EnerHarv.com](http://www.EnerHarv.com), June 16-18, Raleigh, USA



# An Introduction to PSMA

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## Webinars

### 2019 Power Technology Roadmap Presentations

- ▶ **From GaNSPEC DWG to JEDEC JC70.1: An update on industry qualification standards for Gallium Nitride power conversion devices**

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- ▶ **Navigating the present and future trajectories of product compliance standards**

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- ▶ **Power Electronics Continuing Education in the Age of Massive Open Online Courses**

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- ▶ **Emerging Mixed-Signal Control and Hybrid Topological Solutions for Designing High Power Density Dc-Dc SMPS**

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- ▶ **Worth of a Watt – Its Capital Equivalent**

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- ▶ **SiC penetrating electric vehicle market; a 2018 update**

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- ▶ **Power electronics devices technology and market status**

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# An Introduction to PSMA

## Publications



# An Introduction to PSMA

## The Membership

- o Regular, Affiliate, Educational

### Members, A - Z

Jump to: [A](#) [B](#) [C](#) [D](#) [E](#) [F](#) [G](#) [H](#) [I](#) [J](#) [K](#) [L](#) [M](#) [N](#) [O](#) [P](#) [R](#) [S](#) [T](#) [U](#) [V](#) [W](#) [X](#) [Z](#)

Steven Milne (University of Leeds)

[ABB](#)

Acopian Power Supplies

Acuna, Javier (Institute of Robust Power Semiconductor Systems - Stuttgart University)

AdaClock

Advanced Thermal Solutions, Inc.

Afridi, Khurram (Cornell University)

Ahlgren, William (CA Polytechnic State Univ.)

Allegro MicroSystems, LLC

Altor Limited LC

[Amphenol Interconnect Products Corp.](#)

Anagenesis, Inc.

Andersen, Michael A.E. (Technical University of Denmark)

[Applied Materials](#)

Artesyn Embedded Technologies

[ASE Group](#)

Astronics AES

Mean Well USA

Micro-Tech Consultants

[Microchip Technology](#)

Micrometals, Inc.

MinDCet NV

Molex, LLC

Mornsun Guangzhou Science & Technology Ltd

Moschopoulos, Gerry (University of Western Ontario)

Murata Power Solutions

Muth, John (North Carolina State University)

NAMICS Technologies, Inc.

Narveson Innovative Consulting

[National Renewable Energy Laboratory](#)

Naval Surface Warfare Center, Crane Division

Navitas Semiconductor

Nelms, R. Mark (Auburn University)

NetPower Technologies, Inc.

# An Introduction to PSMA

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## The Membership

- Power Product Designers
- Manufacturers
- Component Suppliers
- Power Electronics Educators
- National Labs
- Consultants / Analysts
- Press

# Key Markets/Drives of Focus

## ⚡ The Power Sources Ecosystem

### ○ Power Supplies

- Supply Chain
  - Semiconductors
  - Passives
  - Raw Materials

- Manufacturing
  - Challenging Designs
  - Tight Cost Controls
  - High Quality Standards

○ ...and sometimes, we **CREATE** the ecosystem.

by Brian Zahnstecher and Mike Hayes

## International Workshop Fosters Energy Harvesting Ecosystem

**T**o capitalize on the growing momentum and adoption of energy harvesting (EH), the Energy Harvesting Committee of the Power Sources Manufacturers Association (PSMA), in partnership with the IEEE Power Electronics Society, the European Center for Power Electronics, the CONNECT Science Foundation Ireland Research



**FIG 1** Most of the EnerHarv 2018 delegation. (Photo courtesy of Tyndall National Institute.)

# Key Markets/Drives of Focus

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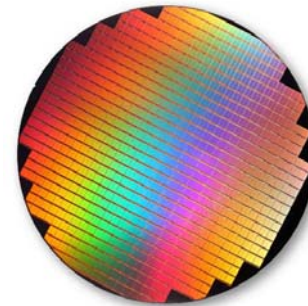
## The Power Sources Ecosystem

- Energy Storage
- Safety / Regulatory
- National Labs / Government
- Academia
- R&D
- Applications / Industry

# Key Markets/Drives of Focus

## ⚡ Markets

- All of Them
- ...But in Particular
  - Automotive
  - Semiconductor
  - Information & Communications Technology (ICT)
  - Motor Drives / Industrial
  - Medical
  - MIL/Aerospace
  - Lighting
  - Consumer



# Overlaps/Gaps Between PSMA & IPC

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## Functional Overlaps



- Manufacturing Know-How
- Industry Drivers
- Documentation / Guidelines

## Opportunities

- We have complex designs with high quality standards, you have manufacturing expertise.
  - Soldering
  - Process Automation
  - Quality Control
  - Training

# Overlaps/Gaps Between PSMA & IPC

## ⚡ Committee Overlaps

	
1-10 Printed Board Design Committee 4-10 Fabrication Processes Committee 5-20 Assembly & Joining Committee 7-30 Product Assurance Committee D-50 Embedded Components Committee	Packaging & Manufacturing Committee
6-10 Product Reliability Committee	Reliability Committee
4-30 Environment, Health & Safety Steering Committee	Safety & Compliance Committee
8-40 Roadmap Executive Committee 8-60 Printed Electronics Technology Roadmap Executive Committee	Power Technology Roadmap Committee
2-30 Terms and Definitions Committee 7-31bt IPC-A-610 Training Committee	Industry-Education Committee
B-10 Packaged Electronic Components Committee	Semiconductor Committee Capacitor Committee Magnetics Committee

# Overlaps/Gaps Between PSMA & IPC

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## Opportunities

- Roadmapping Efforts
  - Cross-Develop
  - Cross-Review
  - Cross-Promote
  
- Membership Growth
  - Cross Promotion
  - Event Discounts
  - Expo Space Sharing?
  
- Marketing / Announcements
  - Social Media
  - Press Releases

# Overlaps/Gaps Between PSMA & IPC

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## Potential Gaps

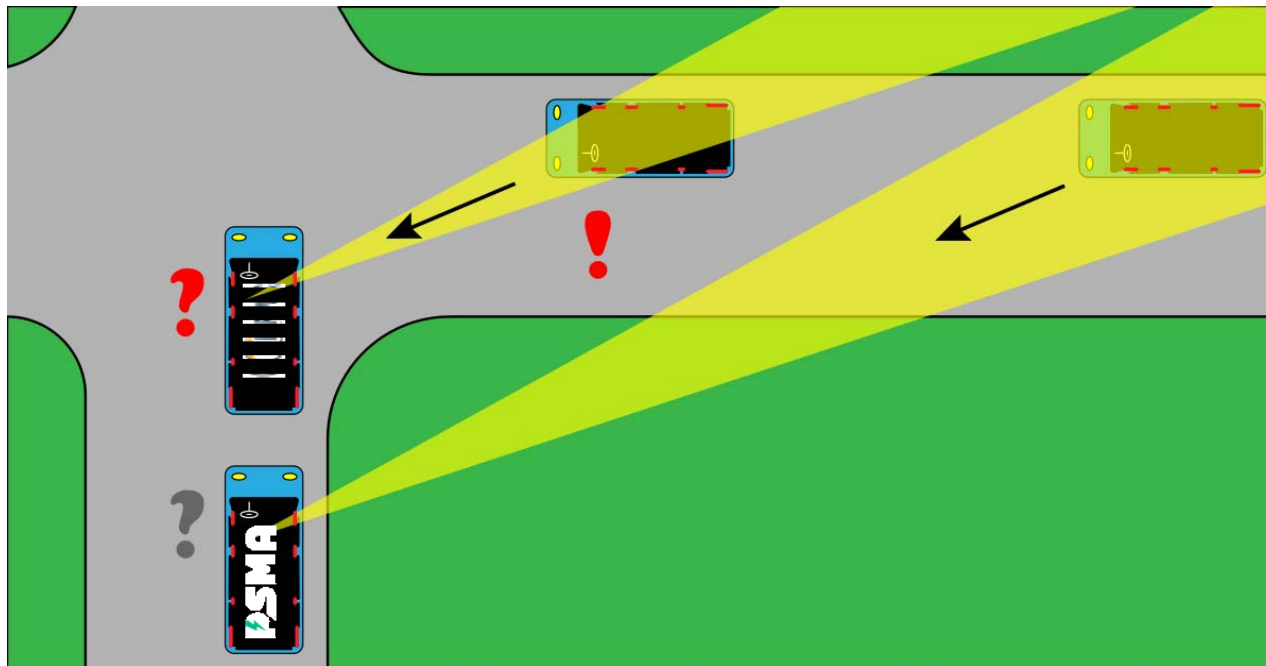
- Here is Where the **TRUE** Synergistic Opportunities Lie
- Always Looking to Attract New Members
  - **NOTE:** PSMA has no requirements for membership to join committees!
- Growth Areas of Focus
  - Automotive
  - Alternative Energy
  - Storage (Battery, Fuel Cells, Etc.)
  - Aerospace & Defense

# Overlaps/Gaps Between PSMA & IPC

## ⚡ Potential Gaps

### ○ Blind Spots

- Keep Each Other on the Bleeding Edge
- Known Vs. Unknown Markets
  - PSMA Learning About Flexible Hybrid Electronics (FHE) Ecosystem
  - IPC Getting Early Visibility on Power/Thermals/Magnetics Trends Driving Packaging Needs (i.e. – SWaP requirements)



# Overlaps/Gaps Between PSMA & IPC

## ⚡ Potential Gaps

- Peer Validation
  - Each Org Can Relay Experiences For Increased Profiles in Markets Traditionally of Lower Focus
- Subject Matter Expert (SME) Access
  - An Absolute Wealth of Knowledge
  - Works Internally & Externally
  - Speaker Pools



# Overlaps/Gaps Between PSMA & IPC

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## Packaging Overlap

- Power Packaging
- Module/System Integration
- Embedded Solutions

**PWR**  
**SOC** 20

 **3D-PEIM**

**IWIPP**

# Synergistic Opportunities Between PSMA & IPC

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## Standards

- IPC Very Well-Established
- PSMA Forward-Looking

## Invited Talks

- Gateway for Cross-Pollination

## Key Events

- APEC
- Travel Awards/Sponsorship

# Synergistic Opportunities Between PSMA & IPC

## Database Coordination

- Enhance Quality of Inputs & Outputs
- Energy Efficiency, Safety & Compliance

[Home](#) » [Technical Forums](#) » [Safety & Compliance](#)

### Safety & Compliance Database



Safety & Compliance Info & Resources for  
The Power Electronics Industry.

[> Click here to go to the Energy Efficiency Database.](#)

- Agencies -	▼	- Agencies by Country/State -	▼
- Standards by Category -	▼	- Agencies by Region -	▼
- Standards by Application -	▼	Standard Number	

For copies of Standards, please contact the appropriate agency. PSMA does not provide copies of standards.

Please select from the menus above to view the database info  
by one of the search methods indicated.

### Recent & Upcoming Events (Includes Upcoming Meetings, Standards Revisions for review and comment, announcement of Updated Effectivity):

(Note: If you click "[more...]" it will take you to the rest of the Event text. However, it will first take you to the Agency page and then there will be a delay while it searches for the Event.)

#### 2020-01-03 - ANSI General Information

Summary:

ANSI Standards Action - January 3, 2020

# Synergistic Opportunities Between PSMA & IPC

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## PSMA Power Technology Roadmap

- Manufacturing Section as Invited Contributor

## Industry Education

- Webinar Series
- Legacy Reprints

## Technical Studies

- Path to Publications
- Workshop Materials

## Workshop Co-sponsorship

# Synergistic Opportunities Between PSMA & IPC

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## ⚡ And Best of All...

APEX attendees will finally be able to explain what APEC is.

*...and*

APEC attendees will finally be able to explain what APEX is.

*(FYI – you will still receive all the typos in emails and have to spell it out verbally a few times.)*

# Summary

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- ⚡ PSMA & IPC are leading, trusted, professional organizations for their target industries/members.
- ⚡ Each organization is run by the leaders of their respective industries and drive global ecosystems.
- ⚡ The organizations have very complementary skillsets and visibility.
- ⚡ There is simply too much synergistic opportunity to leave on the table.

**“The whole is greater than the sum of its parts.”**

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*Aristotle*



Thank you!

Questions?

