



I & CPS

Industrial & Commercial Power Systems

I&CPS Technical Conference Features Development and Updates of IEEE Standards, First-Ever Green Computing Workshop

IEEE's Industrial Applications Society (IAS) held its 61st annual Industrial and Commercial Power Systems (I&CPS) technical conference in Montreal, Canada, in May. This conference is a forum for both experienced and younger engineers to share ideas, present findings from papers, and developing or updating one of the most comprehensive series of IEEE standards.

Conference co-chairs Sergio Panetta and Kent Saylor led the development of four days of sessions and events, including the first-ever Green Computing workshop which addressed energy and thermal management of data centers. The Green Computing workshop was co-sponsored by the IAS Data Center Subcommittee as well as the IEEE SusTech Initiative, which seeks to contribute technical expertise and solutions to address sustainability challenges, including climate change.

The IAS technical committees participating in the conference included Codes and Standards, Energy Systems, Power System Engineering, and Power Systems Protection.

Multiple sessions addressed the IEEE Standards on Recommended Practices for Industrial and Commercial Power Systems, which were formerly known as the 13 Color Books. During I&CPS, Standard Series 3000 working groups held numerous panels, presentations, and comment discussion sessions that addressed the review and publication efforts of the set. These standards articulate many of the best practices for designers and maintainers of industrial and commercial power systems.



I&CPS attendees were able to choose from more than 110 individual sessions, networking opportunities, and committee and subcommittee meetings. Several awards were presented during I&CPS:

- **Lorraine Padden**, the Founder and President of Padden Engineering, received the IEEE Standards Medallion Award.
- **Robert G. Arno**, Director of Business Development at North Point Defense, was given the IEEE Department Achievement Award.

- One technical paper won the Ralph Lee Prize Paper Award, and four papers received awards from IAS committees.

The I&CPS technical sessions covered a wide range of topics. A sample of the insight provided by subject matter experts included:

- **Ian Higginson** of Bentley Systems, in “Introduction to Industrial & Commercial Power Systems,” noted pros should “always be modeling,” with the goal being to regularly have up-to-date data. However, data collection can be the most time-consuming part of many jobs, occupying 50% of your time.

- **Saleh Saleh**, of the University of New Brunswick, noted in “Challenges with Modern Data Centers and Design” that three phase power supply units connected in delta configuration do not have the zero-sequence stability problem that is critical in Y configuration. However, it is important to specify an equal or higher distribution voltage for achieving higher efficiency.



- **Laiqiang Kong**, a Ph.D. candidate at Chung King University, was one of several students presenting at I&CPS. His presentation, “Marine Environment Adaptability Testing,” focused on the behavior of lithium ion batteries (LIB) in marine applications, and he noted they are particularly affected by temperature shifts, vibration, and salt corrosion, degrading their at-sea performance. However, he is further researching ways to support marine LIB applications sustainably.

- **Chun-Lien Su**, of Taiwan’s National Kaohsiung University of Science and Technology, presented on “Next-Generation Sustainable Shipping: A Bibliographic Analysis of Alternative Fuels.” He noted shipping’s carbon footprint accounts for about 3% of global greenhouse gas, and 80% of the world’s trade moves by sea, with about 99% of vessels burning oil. To address this carbon footprint, emerging research trends include dual fuel systems of hydrogen-diesel and ammonia blends, onboard ammonia-to-hydrogen cracking, and integrating cold ironing with hybrid propulsion.

- **Eduardo Enrique**, of Mott MacDonald, presented “Submarine Cable Jackets Affected by Lightning Strikes in Offshore Environments,” and noted he explored this by accident due to off-shore structures he worked with – such as windmills and oil platforms – being struck during storms. He explored whether cable jackets could sustain lightning strikes, as manufacturers do not



typically rate cables for this phenomena. He learned that lightning can cause cable jackets to become penetrated very close to the structure, but degraded rapidly with distance.

“Green Computing” Workshop Debuts

The Green Computing workshop, held on the first day of I&CPS, featured expert speakers who are creating and maintaining data centers with significant environmentally friendly energy elements.

This workshop was created for professionals involved in the design and operations of data centers that will have partial or significant green energy elements. It focused on current approaches and standards, as well as future methodologies that will be guiding the green data centers of tomorrow.

The workshop was organized by IAS Data Center Subcommittee chair Daleep Mohla and vice chair Keith Waters. It was co-sponsored by the Data Center Subcommittee and the IEEE SusTech Initiative, which seeks to contribute technical expertise and solutions to address sustainability challenges, including climate change.

Among the insights provided at the Green Computing workshop included:

- **Maïke Luiken**, President and CEO of Luiken International, presented “Workshop Organization and Path Forward on Green Computing.” She is also co-chair of IEEE’s SusTech Initiative, and Chair of the IEEE Standards Association’s Planet Positive 2030 Initiative, which is a multidisciplinary initiative to find ways to quickly reduce adverse environmental impacts and build a sustainable future. She noted that the growth of data center capacity is expected to triple by 2030. This will be due to the growth of AI, cloud computing, and the continuation of digital transformation across industries.
- **Keith Waters**, Director of Industrial Standards at Schneider Electric, and vice chair of the Industry Application Society’s Data Center Subcommittee, provided insight via “Introduction of I&CPS Data Center Subcommittee & Its Work.” He told how the Data Center Subcommittee is expanding the knowledge of its standards development activity beyond IEEE, which has encompassed its members authoring papers and speaking at industry events, including 7x24. Waters also noted that the subcommittee can support authors and speakers



within the data center community, so any data centers pros interested in joining the subcommittee can contact him at keith.waters@se.com.

- **Maziar Babaei**, Electrical Engineering Team Lead at Schneider Electric, presented on “Modular Data Centers.” He noted that modular data centers are very easy to deploy, use, and scale. This allows them to be more cost-effective versus traditional data centers. However, a universal consideration concern are the challenges AI presents to the powertrain, including switchgear, distribution, and rack power distribution units. This type of rack management necessitates high-density clusters that traditional racks can’t handle. With an increased risk of arc flashes and high temperatures, this danger can be mitigated with hybrid cooling systems such as air-assisted liquid cooling and rear door heat exchangers.
- **Zhaohau Ding**, a professor at North China Electric Power University, presented live from Beijing on “Collaborative Operation for Geo-Distributed Data Centers Towards Green Computing.” He told how data storage demands are exploding, leading to growth in digital storage demand and computer architectures that support these massive data processing loads. This is leading the digital storage/memory hierarchy to trade off performance versus storage costs and potentially sustainability.
- **Tom Coughlin**, President of data storage company Coughlin Associates and IEEE Immediate Past President, created a recorded presentation about “Sustainability in Digital Storage and Memory.” He noted pros need to be aware of the three pillars of sustainability: economic, environmental, and social. These facets should guide their green computing development and design work to be successful.
- **Franco Amalfi**, Director, Sustainability Strategic Initiatives and Partners - North America at Capgemini, explored “Sustainable Generative AI: Balancing Innovation and Environmental Impact.” At scale, he said, more organizations are adopting a net-zero perspective for their data centers. This requires agile development, a sustainable framework, and highly efficient power usage from the design. He is seeing this result in increased business value, with as much as an 80% energy savings.
- **Daleep Mohla**, Principal Consultant of DCM Electrical Consulting Services, and Chair of the IAS Data Center Subcommittee, presented “Existing Relevant Standards and the Need for New Standards.” He stated that as data center professionals, “We have to demystify what’s in the white space.” To aid that, refinement of IAS power standards is a team effort of academics, users, and manufacturers working together to produce



benchmarks for distribution of electricity to industrial and commercial facilities requiring safety and high reliability.

- The event concluded with a **Panel Discussion**: “Data Center Challenges and Opportunities.” Participants included Waters as moderator, and Amalfi, Mohla, and Babaei as panelists. The team provided insight on the importance of data center infrastructure and calculating energy needs in an era of fast growth, power requirements for AI data centers, installation challenges for new cooling technologies, DC power distribution, and other topics.



Event support and guidance was provided by **Wei-Jen Lee**, co-chair of IEEE’s SusTech Initiative and Professor at the University of Texas-Arlington, and **Carol Graas**, Program Director – Future Directions, IEEE.

Next year’s I&CPS will be held in Lexington, Kentucky, in May 2026.

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