

1. Tutorial Title

Defining, Modeling, and Optimizing for Energy Efficiency in 5G

2. Abstract (No more than 500 words. Accepted abstract will be published through the conference website, program, and proceedings.)

With so much hype and news around the deployment of the next-generation broadband network (5G), it is quite alarming to find out much of the “promise” of 5G assumes the energy infrastructure exists to power all this new HW. More fundamentally, the payback estimates for these massive investments all assume the network can be fully utilized, while neglecting network bottlenecks because they relate to energy and not data throughput. The 5G Energy Gap and potential electrical grid destabilization is a risk to the entire deployment and all that is attached to it. This risk is broken down into the concepts of the Power Value Chain, Power Cost Factor, 5G Derate Factor, and other technical/business and even socioeconomic factors.

This entry/intermediate-level seminar introduces these concepts in a simple, yet realistic way to break the complicated network down into manageable pieces for all stakeholders, then translate the unique inputs/requirements of each into the normalized, “universal currency” of energy. From there, both static and dynamic analyses can be performed to assess end-to-end network configurations and optimize each piece through the lens of energy efficiency.

3. Instructor Team: name(s), affiliation(s), and contact information

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Brian Zahnstecher is a Sr. Member of the IEEE, Chair of the IEEE SFBAC Power Electronics Society (PELS), Chair PELS TC7 (Critical Power/Communications/Energy Storage), sits on the Power Sources

Manufacturers Association (PSMA) Board of Directors, is Co-founder & Co-chair of the PSMA Reliability Committee, Co-chair of the PSMA Energy Harvesting Committee, and is the Principal of PowerRox, where he focuses on power design, integration, system applications, OEM market penetration, market research/analysis, and private seminars for power electronics. He Co-chairs the IEEE Future Directions (formerly 5G) Initiative webinar series and is the founding Co-chair of the IEEE 5G Roadmap Energy Efficiency Working Group and has lectured on this topic at major industry conferences. He previously held positions in power electronics with industry leaders Emerson Network Power (now Advanced Energy), Cisco, and Hewlett-Packard. He has been a regular contributor to the industry as an invited keynote speaker, author, workshop participant, session host, roundtable moderator, and volunteer. He has over 15 years of industry experience and holds Master and Bachelor degrees from Worcester Polytechnic Institute.