

Tuesday, 29.9., 2:15 p.m. CET

Power Electronics and Energy Access

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Abstract:

Ensuring universal, affordable and sustainable energy access for everyone is one of the biggest societal challenges of our time. Over a billion people worldwide live without electricity, and another two billion have access that is so unreliable that it severely impacts their life and livelihood. For these communities, the centralized grid uses 20th century technology and does not meet the capital or operating cost recovery goals needed for economic viability. Decentralized solutions, such as solar home systems and microgrids present an alternate approach, but have fallen short of meeting key requirements and cost targets for viability and sustainability in remote areas with a poor technical workforce.

Exponential technologies such as power electronics, communications, computing and IoT, represent key enabling technologies for realizing solutions that can positively impact energy access. However, these solutions require a new holistic approach that is based on solving ‘life-problems’ for these communities, not simply realizing marginally better technical solutions. This includes broader issues of affordability, sustainability, social issues, livelihood and entrepreneurship, as well as digital and financial inclusion into the mainstream of society. Exponential technologies allow us to rethink how these solutions can be meaningfully delivered.

This presentation will focus on energy access solutions based on power electronics, and will identify key attributes that are needed for realizing reliable, interoperable and affordable solutions. Possible topics include DC nanogrids, self-organizing microgrids, solar home systems, productive energy use appliances, transactive energy for microgrids, bottom-up clustered microgrids, autonomous inverters, improving battery life, simple easy to use and easy to scale systems.

The IEEE Power Electronics Society (PELS) identifies Energy Access as a key area of activity, including through a new Technical Committee (TC-12). IEEE PELS also organizes the recurring global competition in Energy Access - Empower a Billion Lives (EBL).

Short Bio:



Dr. Deepak Divan is Professor, John E Pippin Chair, GRA Eminent Scholar and Director of the Center for Distributed Energy at the Georgia Institute of Technology in Atlanta, GA. His field of research is in the areas of power electronics, power systems, smart grids and distributed control of power systems. He works closely with utilities, industry and is actively involved in research, teaching, entrepreneurship and starting new ventures. Dr. Divan also serves as Founder and Chief Scientist at Varentec, in Santa Clara, CA, and was President and CTO from 2011-14, leading the company as it developed its suite of innovative distributed real-time grid control technologies. Varentec is funded by leading green-tech Venture Capital firm Khosla Ventures and renowned investor Bill Gates.

Dr. Divan is an elected Member of the US National Academy of Engineering, member of the National Academies Board on Energy and Environmental Systems, a member of the NASEM Committee on Future Grid, a Fellow of the IEEE, past President of the IEEE Power Electronics Society, and is a recipient of the IEEE William E Newell Field Medal. He also led the IEEE Empower a Billion Lives, the global competition on Energy Access. He has 40 years of academic and industrial experience, 65 issued and pending patents, and over 400 refereed publications. He has founded or seeded several new ventures including Soft Switching Technologies, Innovolt, Varentec and Smart Wires, which together have raised >\$160M in venture funding. He received his B. Tech from IIT Kanpur, and his MS and PhD degrees from the University of Calgary, Canada.