Technical Presentation Session
Sponsored by IAS Young Professionals and Alumni of CMD

POWER AND ENERGY

Keynote Lecture

Wei-Jen Lee, PhD, PE | Professor and Director, Energy Systems Research Center, The University of Arlington | IAS President Elect 2019-2020

Biography: Professor Lee received the B.S. and M.S. degrees from National Taiwan University, Taipei, Taiwan., and the Ph.D. degree from the University of Texas, Arlington, in 1978, 1980, and 1985, respectively, all in Electrical Engineering.

In 1986, he joined the University of Texas at Arlington, where he is currently a professor of the Electrical Engineering Department and the director of the Energy Systems Research Center.

He has been involved in the revision of IEEE Std. 141, 339, 551, 739, 1584, and 3002.8 development. He is the President Elect of the IEEE Industry Application Society (IAS) and an editor of IEEE Transactions on Industry Applications and IAS Magazine. He is a member of IEEE Fellow Committee. He is the project manager of IEEE/NFPA Collaboration on Arc Flash Phenomena Research Project.

Prof. Lee has been involved in research on Utility Deregulation, Renewable Energy, Arc Flash Hazards and Electrical Safety, Smart Grid, MicroGrid, Industrial Internet of Things (IIoT) and Virtual Power Plants (VPP), AI for Load, Price, and Wind Capacity Forecasting, Power Quality, Distribution Automation, Demand Response, Power Systems Analysis, Short Circuit Analysis and Relay Coordination, Distributed Energy Resources, Energy Storage System, PEV Charging Infrastructure Design, AMI and Big Data, On Line Real Time Equipment Diagnostic and Prognostic System, and Microcomputer Based Instrument for Power Systems Monitoring, Measurement, Control, and Protection. He has served as the primary investigator (PI) or Co-PI of over one hundred funded research projects with the total amount exceed US$17 million dollars. He has published more than one hundred and seventy-five journal papers and two hundred ninety conference proceedings. He has provided on-site training courses for power engineers in Panama, China, Taiwan, Korea, Saudi Arabia, Thailand, and Singapore. He has refereed numerous technical papers for IEEE, IET, and other professional organizations.

Prof. Lee is a Fellow of IEEE and registered Professional Engineer in the State of Texas.

Keynote Lecture 1

Effectiveness of Zero Pricing on Demand Shifting of Residential Customers

Power Point Presentation, 30 min

Abstract:

Load participation is vital for the Smart Grid development. As an effective tool to improve reliability, stability, and financial efficiency of the power grids, Demand Side Management (DSM) has brought significant financial and technical benefits to the power systems. As one of the price-based Demand Response (DR) programs with less control costs, the Time-of-Use (TOU) program has been applied as default rate structure by many utility companies. To avoid financial risks and make the most profit out of the market, utility companies treat TOU as an effective strategy to change customers' electricity consumption patterns. As reported in many literatures, existing TOU programs are not effective as expected in many developed countries due to the complexity of human behaviors and disparities of residential customers. To examine whether to obtain different outcomes of TOU on the residential customers in developing countries, actual utility usage data from residential consumers in Shanghai, China are analyzed in this presentation. The result shows current TOU in Shanghai, China has similar trends as TOU in developed countries. For power systems with less than ideal operation reserve, an effective TOU program is urgently needed in the utility industry. In recent years, a creative TOU pricing structure that has been

introduced at Electrical Reliability Council of Texas (ERCOT) deregulated market, and it shows that the introduced "zero pricing" strategy has significant impact on customers' consumption patterns. The purpose of this presentation is to discuss the key reasons that underlying ineffectiveness/effectiveness of TOU programs at residential level.

Lectures of IAS YPs and CMD Alumni

Smart Energy Management System for Microgrid: Buildings, Campuses and Rural Electrification

Power Point presentation, 30 Min

Rajeev Kumar Chauhan, PhD, Assistant professor, Department of Electrical Engineering, Dayalbagh Educational Institute, Agra.
Senior Member of IEEE, IAS, IEEE Student Branch Counselor and Advisor, WIE Affinity Group at Dayalbagh Educational Institute, Agra.

Biography: Dr. Rajeev Kumar Chauhan graduated in Electrical Engineering from the Institution of Engineers (India). He received M. Tech degree in Control and Instrumentation Engineering from Dr. B. R. Ambedkar National Institute of Technology Jalandhar, India and earned Ph.D. in Electrical Engineering from IIT Mandi, India. He is working as Assistant professor with the Department of Electrical Engineering at the Dayalbagh Educational Institute, Agra. He has worked as Research Scientist (2018-19) at the University of Manchester, United Kingdom and Visiting Scientist (2014) with the University of Texas at Austin USA. He received 11 national and international awards and fellowships including POSOCO Power system Award (PPSA-2017) and Best Ph.D. Thesis Award, 2nd prize (Category Energy) in IEEE IAS CMD Humanitarian project contest 2017, BASE-2014 and many more to recognize and reward for his innovative technical research excellence in power system. Dr. Chauhan author of more than 50 publication in journal, book chapters and conference proceedings (IET, Elsevier, Springer and internationally renowned). He has edited 03 books with Elsevier and IET. He has 3 sponsored and consultancy project of more than 1.3 million rupees. He has been filed and published 4 patent in India. He is a senior member of IEEE, WIE, IAS and member of IE (India), IDES, IAENG Hong Kong, and ICASIT. His research area includes, DC Microgrid, Energy Management, Battery monitoring and Control, Electric Vehicles, Weak Grid Integration of Renewables, Microgrid Protection.

Abstract: The power loss during charging/discharging of the battery is the great challenge for the autonomous DC microgrid supplied by PV. It decreases the system efficiency. The control objective of the proposed DSM scheme is to use the PV energy more efficiently. The presentation is on the control algorithm shifts the deferrable load from non-sunny hours to sunny hours and decreases the building demand during non-sunny hours. In this way it decreases the charging/discharging cycles of the batteries. This is reducing the power losses in the battery and improves system efficiency. The proposed scheme reduces the size of the PV plant, storage and capital cost of the system.

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