

## Flexible load: why, when and how

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**Summary:** After 130 years of the development, power systems are at cross roads. The originally envisioned concept of centralized bulk generation, highly available transmission system, radial distribution system and passive load does not seem to be sustainable. The highly variable renewable sources, heavily utilized transmission, distribution with bidirectional flows and load that can act as a resource are recognizable trends for the future. This talk focuses on the role of the flexible loads, often called “prosumers” (producing and consuming) or “prostomers” (producing and storing energy). It examines why such loads may be introduced, when they may become a deciding force and how such loads may be operated.

This talk will reflect on unique impacts from renewable resource variability, distributed generation interfacing, uses of power electronic controllers, penetration of electrical vehicle EVSE, etc. that are felt at large scale only recently. The concept of microgrids and transactive energy will be revisited in the context of the electricity markets making distinction between traditional whole sale and retail markets participation vs. a market that may evolve directly between the willing and able parties making arrangements “behind” the meter much more flexible and personalized. The dual role of the flexible load, both supporting the grid and operating independently, will be discussed.



**Short Bio.** Dr. Mladen Kezunovic is a Eugene E. Webb endowed Professor at Texas A&M University where he was employed since 1986. Dr. Kezunovic serves several leading roles at the university: Director, Smart Grid Center; Site Director, NSF Power Systems Engineering Research Center (PSerc), and Director, Power Systems Control and Protection Lab. He also acts as the Principal Consultant, as well as President and CEO of XpertPower™ Associates, which has been providing consulting services for utility industry for over 25 years. He worked for Westinghouse Electric in the U.S.A. as a Systems Engineer developing the first all-digital substation design during 1979-1980 and for Energoinvest Company in

Europe as the Technical Lead for substation automation development during 1980-86. He was a consultant for EdF’s Research Centre in Clamart, France in 1999-2000 and held a Visiting Professor position at the University of Hong Kong in fall of 2009. He was named an Eminent Scholar at the Texas A&M University in Qatar in 2015/2016 and Special Visiting Researcher in Brazil in 2015/2016. He also acted as a consultant to over 50 utilities and vendors worldwide, and served two terms (2009-2013) as a Director on the Board of Directors of the Smart Grid Interoperability Panel (SGIP) representing research organizations and universities.

Dr. Kezunovic was a Principal Investigator on over 100 R&D projects, published more than 500 papers and gave over 100 invited lectures, short courses and seminars around the world. He is an IEEE Fellow and Distinguished Speaker, CIGRE Fellow, and Registered Professional Engineer in Texas. He is the recipient of the Inaugural 2011 IEEE Educational Activities Board Standards Education Award “for educating students and engineers about the importance and benefits of interoperability standards” and CIGRE Technical Committee Award for “remarkable technical contribution to the study committee B5, protection and automation” in 2013.