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Dr. Majd is a registered professional engineer in CA, NY, and OR. He has more than 15 years of experience in different sectors of the power industry including working with power system analysis software development companies. He has worked with design & consulting, oil and gas, mission critical facilities, as well as renewable energy companies. Afshin has taught a large number of power system courses at different institutions including UC Irvine Institute of Technology, and Portland State University. His courses have been offered both at graduate and undergraduate levels. Afshin has worked on harmonics, power flow, short circuit, device evaluation, filter design, coordination, system reliability, renewable energy grid interconnection, and engineering design and simulation of power plants. Dr. Majd is an IEEE senior member, and chairs the Academic Development Subcommittee of the IAS Electrical Safety Committee. He has been actively contributing to the IEEE 1584 working group since 2015. Afshin is a member of the IEEE Smart Cities operational committee.

Dr. Majd career started with OTI (developer of ETAP), where he worked with many different clients to model their systems. After that, he joined Emerson (Electrical Reliability Services) as a Power System Study Engineer to work on optimizing client's system performance, and addressing short circuit, arc flash issues in their facilities. In that position, he worked with different modeling tools, and got exposure to the hands-on power system issues. In 2010, he joined Piller, one of the three largest rotary UPS manufacturers in the US. As a Senior Application Engineer, Afshin worked with the mother company in Germany, presented the product to more than 20 large consulting companies, and participated in several multi-million dollar proposal review meetings with the Piller USA CEO, and the potential clients' top management/technical teams. Afshin visited design groups in Germany, and France in several occasions to have in-person meetings with them. Later in 2011, he joined Vestas, the largest wind turbine manufacturer in the world. Afshin acted as the highest technical level of escalation for the grid interconnection code compliance, and technical issues for the North American countries. He traveled to Denmark several times to meet with the Vestas senior design engineers/managers. He played a very critical role in the bidding process and later on execution of the Blackspring Ridge (300MW) project in Canada. Dr. Majd is currently Principal Power System Engineer with EasyPower. In this position he has taught 5 weeklong classes with total of 100 or more students. The classes have been very well received. Dr. Majd's unique background, and experience can be a great asset for the IEEE organization, where he has consistently contributed since 2000. Afshin's presentations at the local IEEE chapters have drawn a large crowd, and has helped other engineers to learn, and share his knowledge.

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How to Collect Data, and Perform Arc Flash Studies Using Commercial Software Packages

IEEE 1584-2002 is currently under review, and a new version is expected to be released later this year or in 2019. This standard along with the NFPA 70E are the two major references for the Arc Flash studies. To perform an AF study there are several key steps to take. As the codes, and standards evolve and get more complex the need for utilizing a simulation package increases. In this presentation, a full review of the arc flash studies, applicable codes, and standards is provided. Then, the topic of what information are required, and what is the best way to model the system is discussed. An example of a simple system along with the required data to perform fault calculation, and arc flash risk assessment is presented.

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Renewable Energy Modeling

Renewable energy is becoming more and more popular, which means a large amount of wind and solar generation systems are being added to the power grid each year. As the number of the renewable energy plants grows, so do the related rules, standards, and regulations. Before each project receives approval to be connected to the grid, it needs to go through several phases of engineering studies. These studies, and the required tools to perform them are extremely important, as the smallest change in their outcome can increase or decrease the budget of a project by several million dollars. In this presentation, we discuss some typical studies that need to be performed on a wind plant. The presentation focuses on the FERC/NERC and IEEE 1547 rules, and highlights the techniques used for simulation and modeling of these plants. There is an emphasis on power flow and harmonics, and some review of the FERC 661 standard.

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IEEE 519 2014 Updates, and Its Potential Impacts on the System Studies

All the harmonics studies refer to IEEE 519 standard, which covers a wide range of applications. The standard was revised in 2014 with some new additions, which will impact all the older studies. In the latest standard revision there were several updates to the tables, which provide harmonics limits. Also, there is a new limit as the highest order harmonics to be considered in the THD calculations. In this lecture we look at the potential areas, that need a change compared to the old studies. Also, there is some conversation on how new modeling tools should cover these updates. All the modeling software packages should comply with the latest version of the 519. This standard, even though designed for the Point of Common Coupling, is widely used for all the buses in the power systems.

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Harmonics Fundamentals, and Their Modeling in Power Systems

Harmonics play a very important role in the Power systems. They can cause nuisance tripping, overheating issues, and interfere with the device operations. In this presentation, we review the fundamentals of the harmonics and their impact on power systems. We present a full review of the related concepts including applications of the Fourier series, calculation of the Displacement Power Factor (DPF), current and voltage THD values, and other important factors in a harmonics study. We discuss the importance of understanding the concepts when using modeling tools and the verification of the simulation results. We also describe how different software algorithms use these concepts to analyze networks.