System Reliability vs. Efficiency: Are we being Redundant?

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Abstract:

System designers often strive to increase reliability by building redundancy into their architectures. Since we know that even the most reliable components must fail eventually, the best approach to overcoming that risk is to add in a redundant component to provide the required functionality in the case of a failure. The problem with this approach is that usually, we like to allow each component to carry equal parts of the load, and switch over in the event of a failure. As such, the efficiency of the system suffers, and energy use is increased. This presentation will discuss the pros and cons of this approach, and suggest some alternatives that can increase efficiency and save energy.

Bio: Brian Fortenbery has been with EPRI for 15 years and currently serves as program manager for Energy Efficiency in Power Electronics. Current major research topics include design improvements in power supplies for consumer electronics and data centers, with emphasis on development of metrics and standards. A significant part of this research involves field demonstrations of emerging technologies in power distribution and efficiency improvement systems.

He spent the first ten years at EPRI in the field and the laboratory, using their patented portable sag generator to characterize customer systems with regard to their voltage sag sensitivity. This allowed recommendation and verification of sag mitigation solutions at the site. He also managed the power quality research program on end use equipment for the EPRI. As the author of several EPRI technical reports, he has developed expertise in the areas of harmonic studies and sag mitigation techniques. He gained much of his expertise in building power distribution while serving as senior associate engineer at the Watts Bar Nuclear Power Plant in Tennessee. His duties at Watts Bar included performing and documenting calculations for voltage drop, ampacity evaluation, short circuit protection studies, and fuse and breaker coordination studies of power distribution systems.

Before EPRI, he taught electrical engineering and technology courses at Cleveland State Community College and spent four years with Ebasco Services Inc as a power distribution engineer at the Watts Bar Nuclear Power Plant in Tennessee. He holds a B.S.E.E. and M.S.E.E. from the University of Tennessee.