Contribution ID: **304** Type: **Poster Presentation**

Nano-Grids: Future Power Grids –Concept and Review Paper

Thursday 7 July 2016 14:40 (20 minutes)

This paper proposes reviewing the recent advances and new technologies for NanoGrids systems. It aims to make a point of view on the Nano-grid as a future promising electric power system grid. It tries to reply some questions like what are the Nano-grids, how they are related to smart-grids and what is the difference between them and Micro-grids. Microgrids are building blocks of a Smart-grid. Nanogrids are building cells of a Micro-grid. They should be efficient, reliable, self-sufficient, and fault tolerant to contribute to a healthy smart grid. A Nanogrid may not be directly connected to a grid. It should stably operate in clusters (in a Microgrid). It should be able to operate in an islanded mode. Nanogrid should be operationally independent to make the Smart-grid reliable and fault tolerant with reduction of converters number in Nanogrid. This work addresses, discusses and reviews the following aspects related to this kind of grid: Basic Architecture, Modern Domestic Loads, DC Compatibility, Nanogrid: Present Technology, Energy Control, Efficient Design Strategies, Transformer-less Single topology for Multiple jobs, Battery life, Optimal charging circuits, Special Converters for Nanogrid, Multi-Control Single-Input, Nano-Grid Construction, Interconnecting Nanogrids and Conceptual power electronics based electric power system in future sustainable home. Moreover, Communication within the Nanogrid system, Future DC Nanogrid, Conceptual dc nano-grid in a future home, a contemporary vision of "smart"electrical system nano-grid in residential buildings, Solid State Lighting, Grid-connected mode, Grid-connected to stand-alone mode transition, Static Operation of a DC Nanogrid and The Main Characteristics of the DC Nanogrid System are also investigated. AC Nano-grid and DC Nano-grid within Contemporary Smart Grid Concepts are also presented. Overview about Modes of Operation: grid-connected and stand-alone are also introduced. Communication within the Nano-grid system plus some Characteristics of the DC Nano-grid System and Static Operation of a DC Nano-grid are presented in brief. All the previous items are supported with comprehensive reviews from other researchers work in the review part of the paper. Finally, Nano-grids'Benefits and Challenges with possible Research Topics are addressed.

Author: EL SHAHAT, Adel (Georgia Southern University)

Presenter: EL SHAHAT, Adel (Georgia Southern University)

Session Classification: Poster 2-A

Track Classification: Power Electronics, Power Supplies, Prime Power, Rotating Machines, and Energy Converters