

Title:	Sustainable FPGA Controlled Hybrid LED illumination System Design
---------------	--

Akram A. Abu-aisheh¹, Sameer Khader², Ahmad Harb³ & Ashraf Saleem⁴

Authors: ¹ University of Hartford, West Hartford, CT, USA, abuaisheh@hartford.edu
² Palestine Polytechnic University, Hebron, Palestine, Sameer@ppu.edu
³ Jordan University, of Science & Technology, Irbid, Jordan, aharb@just.edu.jo
⁴ Taibah University, Madinah Munawarah, KSA, Ashraf_Saleem@yahoo.com

Abstract: This paper presents a road map for the design and development of sustainable hybrid Field Programmable Gate Array (FPGA) controlled High Brightness Light Emitting Diode (HB LED) illumination systems where the FPGA can individually or collectively control an array of HB LEDs. Photovoltaic (PV) panels are used as the primary source of energy in this hybrid system while the electric grid is used as the backup source that supplies power to the HB LEDs only when the power of the PV system is not sufficient to supply all the system HB LEDs and the PV system batteries are depleted below the minimum level set in the system design.

The hybrid illumination system design presented here is an important link between the current AC-based illumination systems and the future sustainable DC-based solar illumination systems. Computer simulation is an important tool for future illumination system design and analysis, so it is presented in this paper to assist designers in analyzing different designs and in optimizing the one to be implemented.