

# Solar Powered Wireless Sensors & Instrumentation

Michael A. Macchiarelli<sup>1\*</sup>

<sup>1</sup>Imagine Instruments LLC, 7365 Main Street #176, Stratford, Connecticut, USA, 06614

(\*correspondence: mmacchiarelli@imagineinstruments.com)

**FORMAT:** 6-12 page paper plus 30-minute PowerPoint presentation

## KEYWORDS

Solar Power, Energy Harvesting, Batteries, Wireless Sensors, Off-grid Power, Energy Storage, Instruments

## ABSTRACT

The “Going Wireless” trend continues in both industrial and municipal installations. While there is a substantial reduction in installation labor cost associated with a wireless system over a hard-wired system, proper planning during equipment selection and installation must be done to avoid unforeseen maintenance expenses later. Most wireless sensors are powered by a limited-life power source; more often this is a low voltage lithium cell. Depending upon the transmission rate set for data to be sent to the receiving units the battery will over time deplete and require replacement. In applications where a continuous stream of data is needed the battery may last only a few weeks or even worse, a few days.

During this session we will learn about new solutions to this problem by using solar energy harvesting technology. Solar power is becoming the energy of choice to replace limited-life battery cells in remotely located wireless sensing applications. Energy from the sun is collected by photovoltaic cells and stored. In general, energy can be stored in a capacitor, super capacitor, or lead-acid, deep-cycle battery. Batteries leak less energy and are therefore used when a steady flow of energy over very long periods of time. The basic system can provide uninterrupted power for many years without the need of battery replacement. A typical system consists of a solar panel, solar charge controller, deep-cycle battery and a power supply/power conditioner. Sample system components and application examples will be presented. Attendees will leave this session with a comprehensive understanding of energy harvesting technology and the benefit and value of utilizing this new technology to reduce maintenance and operating cost.

----

## About the Author:



**Michael Macchiarelli** is currently the President, CEO of Imagine Instruments LLC . Michael has 23 years of hands-on Product Development experience within the Process Measurement & Control, Automation and Scientific markets. Recently completed projects include a broad line of Industrial Wireless Sensors, Transmitters and Receivers. Prior to launching Imagine Instruments LLC in 2012, Michael worked at Omega Engineering in Stamford, CT for over 23 years as the Product Development Manager and Electronic Design Engineer . Accomplishments include 5 issued and 4 pending US patents, serves on the Technology Management Advisory Board at Central Connecticut State University and is a active member with The Institute of Electrical and Electronics Engineers (IEEE), The International Society of Automation (ISA) and The American Solar Energy Society (ASES).