



DEVELOPMENT AND CHARACTERIZATION OF A SOLAR-BASED ENERGY HARVESTING AND POWER MANAGEMENT SYSTEM FOR A WSN NODE APPLIED TO OPTIMIZED GOODS TRANSPORT AND STORAGE

P. Visconti *¹, R.Ferri ², M.Pucciarelli ^{3#} and E.Venere ^{4#}

Department of Innovation Engineering, University of Salento, 73100, Lecce, Italy

Company Medinok SPA, 80040 Volla, Napoli, Italy.

Emails: paolo.visconti@unisalento.it ¹, roberto.ferri92@gmail.com ²,
m.pucciarelli@medinok.com ³, eugenio.venere@medinok.com ⁴.

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Abstract – This paper describes a harvesting and power management system that can be equipped with a Wireless Sensor Network (WSN) node in order to harvest energy presents in the environment to be used for sensor node power supply. The proposed scope is to develop a harvesting board exploiting available integrated circuits and devices for extending battery life-cycle of sensor node developed by Medinok SPA. The aim is to realize a WSN able to perform a monitoring of principal physical parameters deemed of interest in a facility, as automatic as possible, for the storage and handling of goods, applied for example to a commercial seaport, where stored containers need to be continuously monitored. Battery life-time is a main problem especially in networks where sensor nodes are not easily accessible. For this reason, sensor nodes are commonly equipped with power management devices able to supply power in an intelligent way from the harvester when harvestable energy is available or from backup batteries ensuring, under every operating conditions, the correct functioning of the sensor node. In this work, a solar-based harvesting system, based on LTC3330 IC, was designed and tested on Medinote sensor node but usable for any device requiring to be fed.

Index terms: Harvester, Power management system, Wireless sensor network, Solar cells, Sensor node power supply, Battery life-cycle, Experimental setups for harvester characterization, Measurements.