

Abstract

In combining multiple energy harvesters from different sources, there is a problem caused due to varying direct current (d.c) output which reduces coupling efficiency and total working of the system. Thus in this research, a hybridizing system is designed in which the blocking oscillator is used as an energy combiner to improve on the coupling efficiency and enhance the system's working operation. The hybrid harvester comprises of a blocking oscillator, radio-frequency (R.F) harvester, solar harvester and piezoelectric harvester. The blocking oscillator made of four inductors all wound on a single toroid with three transistors as switches for the input. Rf harvester was designed using copper coil as antenna to receive the necessary power needed. Piezo-electric harvester is designed using piezo-elements arranged parallel to each other on a board. Solar panel with dimension 238 by 140 by 17mm was used for solar energy harvester. The result of the system was able to power a sensor of 3V and charge a 10V super-capacitor even at low level of 0.3V. It attained 90% efficiency. In conclusion a hybrid energy harvester with an improved combining system was successfully developed which achieved better performance at maximum working condition and was still able to give manageable performance at low working condition.