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Research Paper

# ENERGY CONSERVATION ON WIRELESS SENSOR NODE AND NETWORK USING FREE ENERGY RESOURCE

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This paper describes the design and implementation of Wireless Sensor Node (WSN) and aim to utilize the power energy from free energy sources. WSN is having problem with utilization of power energy sources for a long time interval communication. Today we are implementing the solar cells for long lasting communication, but there also some limitation of solar cells. It can produce a small amount of energy, a sensor node should wait until a sufficient amount of energy is charged in the capacitor before sensing the communication. So the sensor node should wait for a long period for capacitor charging and the communication over a period of time. The solar cell panels getting high value of cost for manufacturing and lots of demand due to the globalization. In order to address this problem, we have to design a mechanism to produce energy from free energy resource for continuous communication possibilities and improve the lifetime of the Wireless Sensor Nodes.

**Keywords:** WSN, Free energy resource, Solar cells

## INTRODUCTION

In Wireless Sensor Networks, nodes are small devices that collect and transmit the data from the remote location into the Base Station (BS). The Sensor Node should have the capability to extract the energy from the ambient source of the long lasting communication. The main goal of this paper to produce and manage energy from free energy sources or Magnetic motor and these produced energy stored in the rechargeable devices like battery, super capacitor. The WSN node must be used for sending the environmental data by using various types of sensor application

like moisture, temperature, light intensity and humidity data. Those collected data are shared with nearby Base Station. For each time of data communication the energy node of the sensor lifetime is to be decreased. Today we using more rechargeable batteries with Solar cell are implemented for boosting the life time of Sensor Node. In case the sensor node deployed on the dark light place the solar cell can produce energy at minimum level and also there is a chance of occurring power loss from the solar cell panel, which emits higher level of heat density on the sensor node circuit and reduce the lifetime of the

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sensor device. So, we implemented Magnetic Motor Power Generation from the free energy source to increase the lifetime of the sensor node and making continues power generation management for data communication.

## A SURVEY ON WSN AND FREE ENERGY GENERATOR

### WSN Types and Power Consumption

WSN is typically tiny electronic devices, they can be equipped with a limited power sources of less than 0.5-2.0 amp-hour and 1.2-3.7 V.

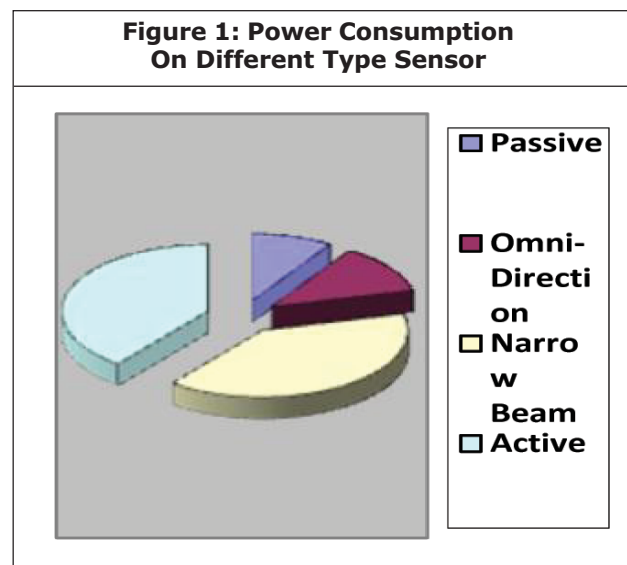
Generally WSN is identified on four various types and the Power Consumption evaluation (approximately) on the different type sensor are shown in Figure1.

- (i) Passive
  - (ii) Omni directional
  - (iii) Narrow Beam
  - (iv) Active Sensor
- (i) Passive Type - This type of sensor sense the data from the environment of Active Probing method. They are self -powered, energy is needed only to amplify their analog signals. So, the energy utilization at a minimum level of energy needed for regular operation, maximum level of energy needed on signal amplification.
- (ii) Omni directional Sensor -This type of sensor doesn't have a notion of direction involved in the measurement, which is used to focusing on their environment. So, the energy consumption is more on covering those areas.
- (iii) Narrow- Beam Sensor -This type of sensor is well defined notion of direction in the measurement, which is similar to camera for focusing their environment. So, the energy consumption level is maximum on particular focused area.

- (iv) Active Sensor -This Active type sensor is used for active probing communication in their environment, which required more energy utilization from the power sources.

In each type of the sensor node has the certain area for coverage and report the accurate data to their corresponding Base Station. The Power consumption in sensor is signal sampling and conversion of physical signal to electric ones, signal conditioning and analog to digital conversion.

**Figure 1: Power Consumption On Different Type Sensor**



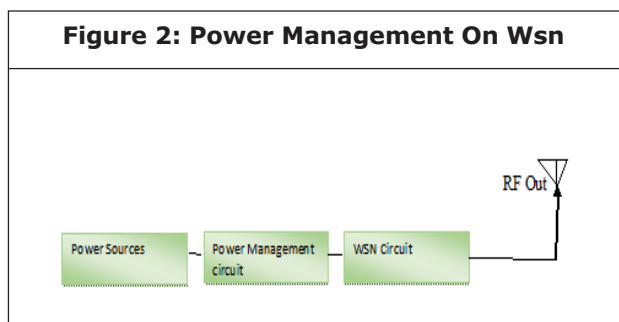
## POWER SOURCES AND MANAGEMENT

### Power Management on WSN

In WSN is once placed, there is the problem faced hard to reach the location, inconvenient and regular changing of batteries makes cost worthy. So, the major aspect of WSN ensures an adequate energy available to the power system. The sensor node consumes more power for sensing, communication and data processing (Figure 2). Power sources generally we use rechargeable batteries to store sufficient energy and power management circuit having the super

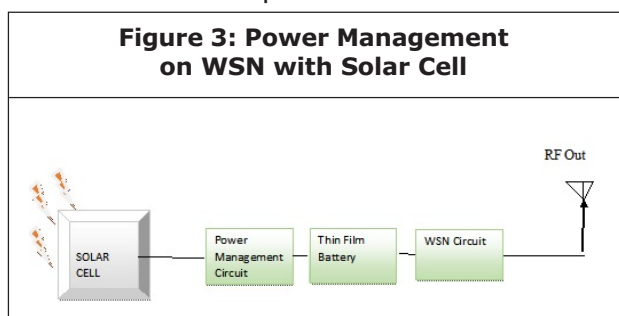


capacitor to store and discharge the needed power to the sensor node. The WSN circuit having Sensor devices aims to sensing data from their environment. The energy cost of transmitting 1 KB distance of 100 m as well as executing of 3 million instruction by a 100 million instruction per second by the processor. Power saving can be done through by both rechargeable and non-rechargeable batteries. Sometimes sensors having two power saving policies used for Dynamic Power Management.



### Power Management on WSN with Solar Cell

The WSN can able to getting the power sources from the Solar Panel array of approximately 40 mA generation and the power stored in the Thin Film Battery. The WSN has the capability of harvesting energy from the solar energy resources successfully on the outdoor environment. The energy can be delivered through battery and super capacitor as shown in Figure 3, thin film battery was used to store and discharge the energy. But which is not suitable for the dark shadow place because the maximum

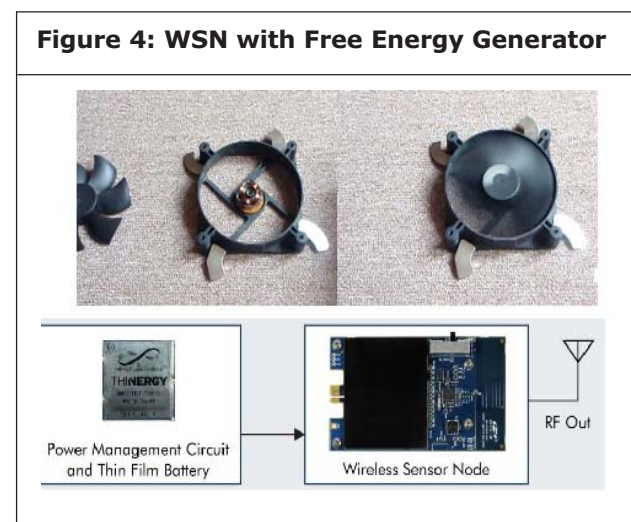


amount of energy needed for night time or dark shadow place and it's fully based on weather condition.

## PROPOSED WORK

### WSN with Free Energy Generator

The magnet motor engine is a powerful free energy generator. It's based on the working principle of powerful neodymium permanent magnets for to maintaining the magnetic field. The magnetic field is generated by the aluminum/copper electric coils to maintain a magnetic field. As shown in Figure 4, the electrical energy continuously flows into the WSN system through the free energy generator without any power losses. The free energy generator based on the working principle of permanent magnetic field of the magnets to generate the force moving the rotor. Only the powerful neodymium magnets can able to produce much more power to produce an energy source. We have given this free energy power source to be input to the WSN for maintaining long life time validity and continuous communication. The Magnetic Motor Engine is a



type of free energy generator to produce electrical energy and give it as power input to the WSN.

The magnetic motor insulated with aluminum/ copper electric coils to maintain a magnetic field.

An ordinary electric motor can be used to build the magnet motor free energy generator for generating low to high power levels. The maximum power output is much higher than the maximum of the Electric loop free energy generators. The Magnet motor free energy generator is much better-looking, thus fulfilling also the decoration function and these magnetic motors can able to produce much sufficient energy to maintain the WSN of communication. This model is best suited for in depth dark night places or dark forest to sense and monitor their function. In existing systems WSN constructed with the solar cells, in the solar cells always keeps heat density, that will decrease the lifetime of Wireless sensor nodes.

## MERITS AND DEMERITS

### Merits

- No need for external source of electric power and thus a very cheap operation.
- The maximum power output is much higher than the maximum of the Electric loop free energy generators.
- The magnet motor free energy generator is suitable for generating low to high power levels.
- WSN lifetime is to be increased from the free energy generator.

### Demerits

- The magnetic motor is that it cannot be controlled by electrical way.
- We cannot shut it down by the solid state.

## CONCLUSION

The major goal of this paper to create and develop

self-sustained wireless sensor nodes and networks, which reduces the cost of replacing batteries and another goal to maintain significant power resource. It makes the continuous sensor node communication with their network environment. So, these embedded in structures enabling the technologies needed to create self-sustaining wireless sensor nodes based on the factors cost-effective energy harvesting devices, small and efficient devices. Wireless sensor nodes powered by harvesting energy sources like free energy generators will soon become commercially viable and commonplace technologies used in our homes, offices, factories and infrastructure.

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