# Internet of Things Edge Device Power Modelling and Optimization Simulator

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**Abstract :** Wireless Sensor Networks (WSN) are Internet of Things (IoT) edge devices. They are becoming widely adopted in many industries, including health care, building energy management, and conditional monitoring. As the scale of WSN deployments increases, the cost and complexity of battery replacement and disposal become more significant and in time may become a barrier to adoption. Harvesting ambient energies provide a pathway to reducing dependence on batteries and in the future may lead to autonomously powered sensors. This work describes a simulation tool that enables the user to predict the battery life of a wireless sensor that utilizes energy harvesting to supplement the battery power. To create this simulator, all aspects of a typical WSN edge device were modelled including, sensors, transceiver, and microcontroller as well as the energy source components (batteries, solar cells, thermoelectric generators (TEG), supercapacitors and DC/DC converters). The tool allows the user to plug and play different pre characterized devices as well as add user-defined devices. The goal of this simulation tool is to predict the lifetime of a device and scope for extension using ambient energy sources.
**Keywords :** Wireless Sensor Network, IoT, edge device, simulation, solar cells, TEG, supercapacitor, energy harvesting

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