Wavelite and Green House Gas Emissions

Bahar Partov, Wavelite

Wavelite in fact can introduce a disruptive impact in resource utilization and green operations of Internet of Things. The impact on reduction of green house gases is multi-fold:

1) Reducing waste and electricity usage by enabling battery-free sensors:
Wavelite reduces the power consumption of wireless connectivity by a factor of 1000 when compared with a conventional Bluetooth transceiver, reducing the consumption to 100s of micro Watts of power. Hence Wavelite paves the way for practicality of the use of ambient energy e.g. photovoltaic to power up the sensors. This in itself removes the need for battery operated sensors impeding battery waste into the land filled.

According to Cisco's 11th annual visual networking index, Internet of Things (IoT) accounts for nearly half of connected device by 2020. The number of Machine to Machine connections should grow from 4.9 billion in 2015 to 12.2 billion in 2020. The energy required to charge a battery operated IoT device with a battery capacity of 1000mAh roughly equated to 3.3WattHour. We assume that each IoT device in average consumes equivalence of a 1000 mAh per year operating at 3.3V. Note that this is a rather conservative assumption. The total electricity consumption of 12.12 billion devices hence equates to 36,660,000 kw-hours. This totals up to 27,283 metric tone of Carbon Dioxide emission per year, according to the EPA green house equivalencies calculations.

Moreover The metals used to make batteries are a finite resource. As the most accessible and higher grade ores are depleted, mining operations target deeper or lower-grade deposits. For example, their extraction and processing requires more energy and generates more greenhouse gas emissions per tone of metal.

2) Reduction in building electricity usage:

By enabling a self-sustained IoT infrastructure for building automation, Wavelite results in optimized use of electricity usage and hence reduced green house gas emissions. As a quantitative example we choose the use case of smart lighting. This is where Wavelite battery free light sensors are used to measure ambient light levels in commercial buildings. Studies show a truly adaptive control of the lighting can result in 35% energy saving compared to a non-adaptive LED lighting system. Now consider an office floor with an average of 19 LED bulbs that are used in average 8 hours per day. The annual consumption equates to 1110 killoWatt-hour. By

applying a smart and adaptive lighting approach that utilizes the Wavelite platform, we reduce the consumption by 388.5 KilloWatt-hour per floor. This will be 1554 KilloWatt-hour for a four floors commercial building which equates to 1.2 metric Tones of carbon dioxide emission per commercial building. CBECS estimates that there were 5.6 million commercial buildings in the United States in 2012. Hence the reduction in CO_2 emission scales up to 6.72 million metric Tones. The same argument applies to adaptive heating systems that consider per room temperature variations.

3) improving management practices on existing land use types:
Wavelite provides a platform for precision agriculture. Wavelite currently following a path to apply its technology in vertical farming scenarios. vertical farming uses 70 to 95 percent less water and over 90 percent less land, while harvesting 80 percent more per unit of area. Agriculture uses 80 percent of freshwater and produces approximately 24 percent of the world's greenhouse gas emissions. The long term vision for a range of Wavelite products is to enable precision agriculture in remote areas and through the use of battery free sensors.

w http://wavelite.net
e info@wavelite.net
p +1 (0) 438 380 5435

Adress:
780 avenue Brewster, Suite RC-016
Montreal, QC, H4C 2K1