

CO2 Neutral Streetlights (low power & low cost data logger)

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INTRODUCTION

Risø National Laboratory is getting more and more requests from The Danish government on how to save energy. One of the main issue is saving money on power, special when it comes to streetlight. Before the end of the year 2012, 1500 street lamps around Copenhagen will be changed for light sources with low power consumption. Technical and Environmental turn down the energy as a part of Copenhagen's goal of reducing the city's CO2 emissions by 20 percent by the end of year 2015. But how much power will the new lamps consume? And can a street lamp produce sufficient power even in Denmark? Here will a low cost & low power [1] Datalogger come handy.

DESIGN

The data logger is an electronic device that records earthquakes (Sensor network), Wind, daylight, power used/produced on the street lamp over time. Data will then be uploaded via a wireless radio MESH [4] network (868 Mhz) to a database server for later analyze. The Prototype is developed on two microcontrollers (AVR and ARM Cortex-A8) with the low power and with fault tolerant in mind, equipped with extra storage for offline catching (like a uSD (16/32Gb)). The ARM Cortex A8-board is running a full version of Ubuntu (OMAP), with Apache-webserver, PHP and MySQL-database for local catching of data, in case of the network is offline. Data will then be sync with the database server then there is connectivity. Controlling the Datalogger device can be done from the control center's webinterface or on the device it self (via Web or SSH). The device can even be used for other purposes like a (MESH) WIFI net, something like freifunk in Berlin & WNDW [3,2]. In a catastrophe area the "lamp-network" will still be running (because it is off-grid), even when the infrastructure is destroyed or very heavy loaded.

HOW LOW IS LOW?

How low cost? In a price range of around max. 100 \$ pr. main-unit and around 30\$ for each 868 mhz-node (max. 253). A data logger with the same functions can be something like the DT82E [3] datalogger (no nodes!) from DataTaker that have a price of £752 pr. Unit. (like 1190 \$) please note that's in 2012 exchange rate. *How low power?* The main board is running on max. 4 Watt-5volt with a 500(720) Mhz Cortex-A8 and the 868 mhz-nodes is running on max. 1 watt-3.3volt. The goal is a very low/non power-footprints on the measurements, in this case a street lamp.

REFERENCES

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