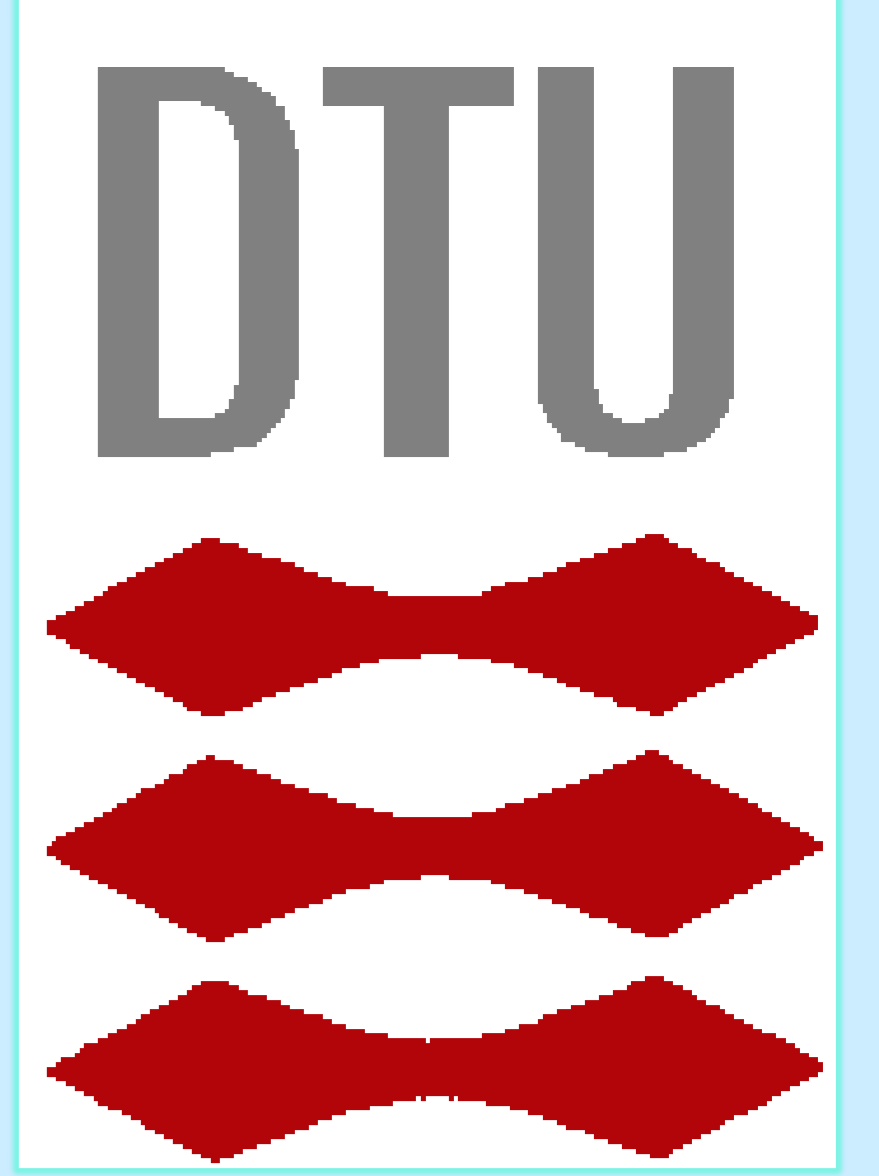


Low power & Low cost data logger for CO₂ Neutral Streetlights

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Introduction and Motivation

The Danish municipalities are going to replace a major part of the street lamps in the years to come. Interest in using renewable energy for street lamps is increasing and DTU Fotonik and DTU Wind are investigating solar and wind powered LED systems for street lights.

There is a need for simple, smart, cheap, low power data logger system for gathering information about different test setups.

The data logger system will provide new possibilities to:

- Control the lamps intelligently (through sensors)
- Network services
- Error messages

Example of an CO₂ Neutral Street Light:

The Nheohybrid 400

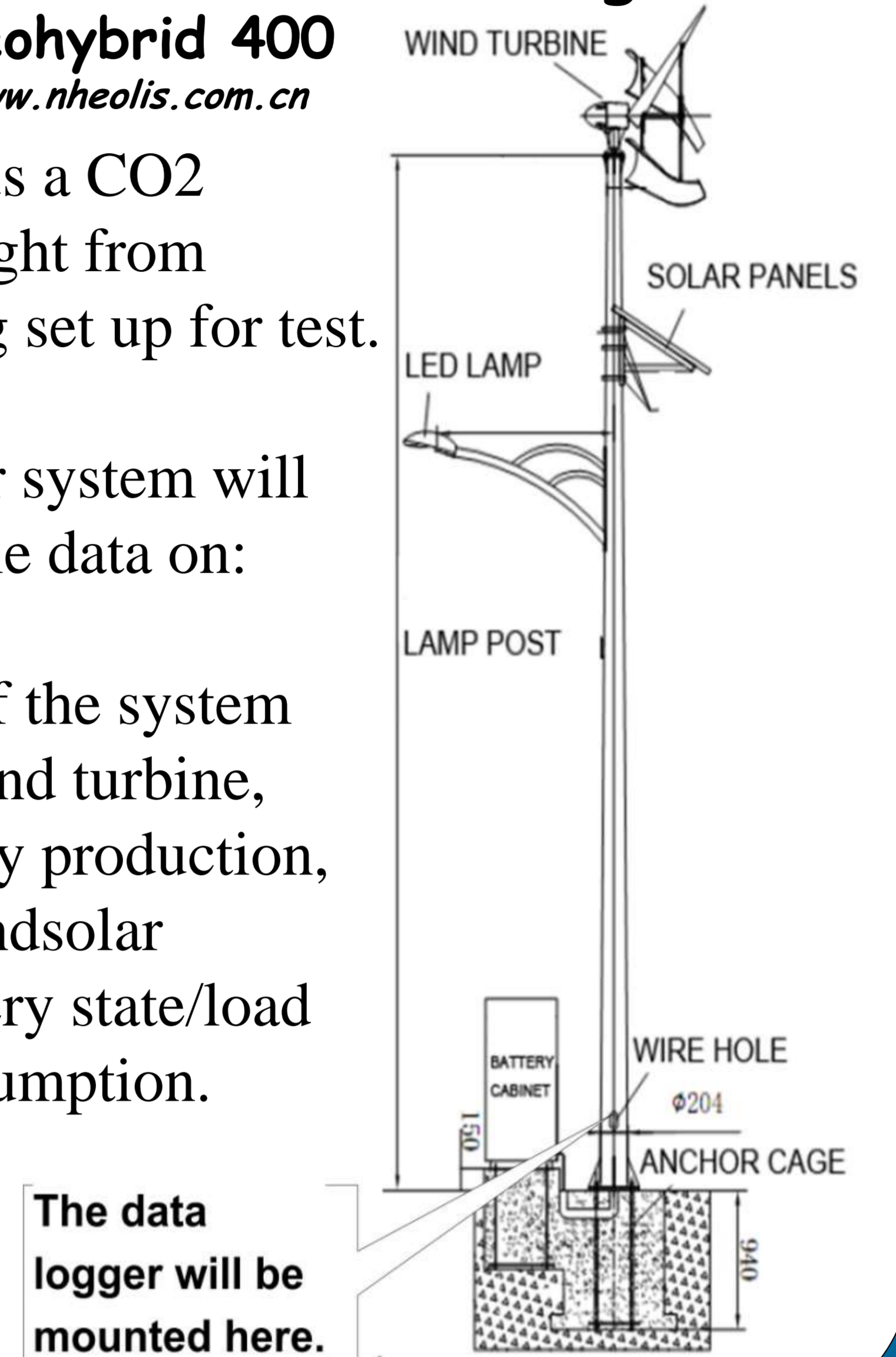
Source: www.nheolis.com.cn



On Risø campus a CO₂ neutral street light from China are being set up for test.

The data logger system will provide valuable data on:

the operation of the system components, wind turbine, solar cell energy production, actual local wind solar resources, battery state/load and LED consumption.



Old System

- A standard data acquisition : 300Watt
- Hardware: Dell Optiplex in a modcase.
- Running Microsoft Windows
- Price : ~400 US\$



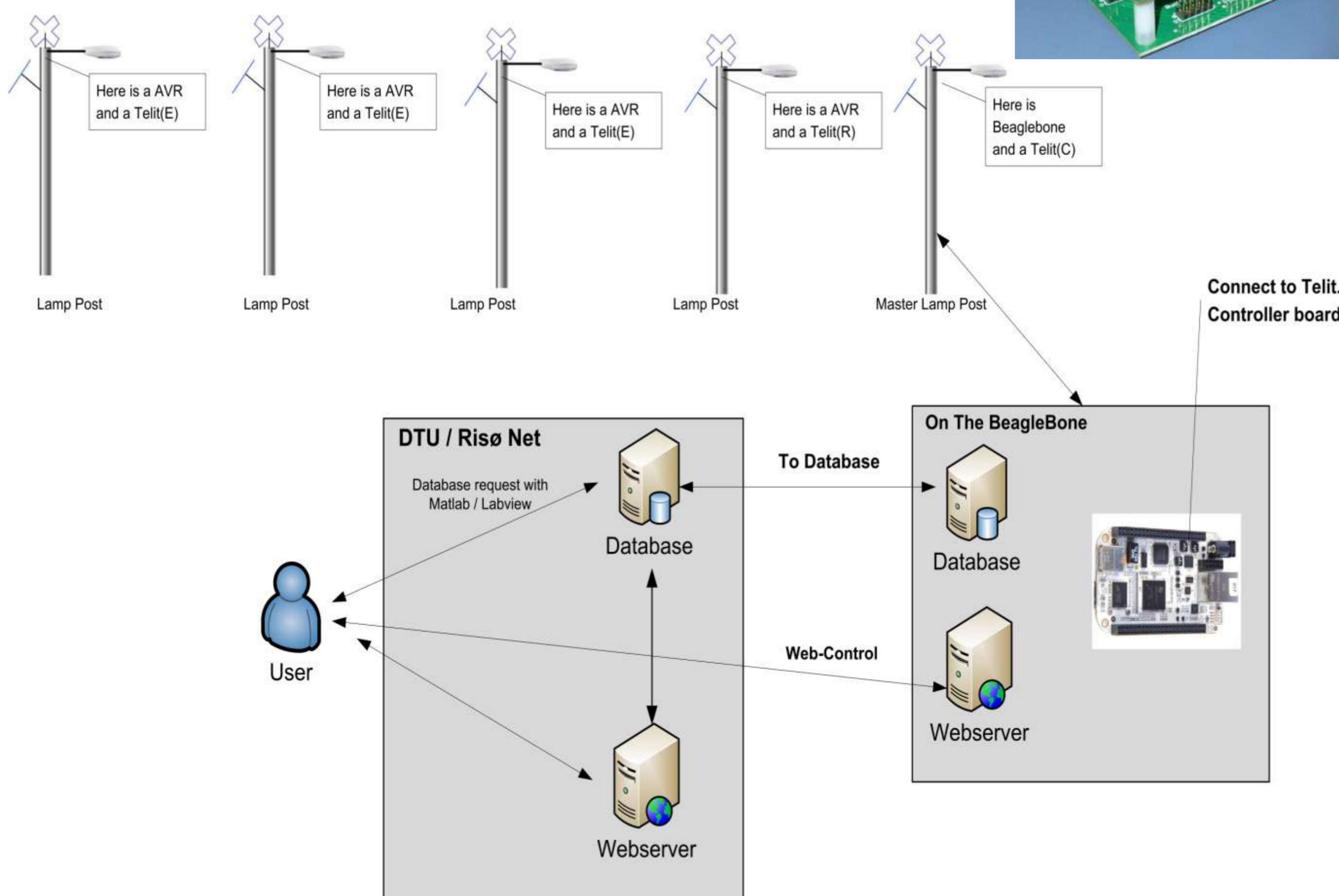
New System

- Low power data acquisition : 2 Watt
- Hardware: Beagle Bone[2]
- Running Ubuntu (Linux)
- Price : ~80 US\$



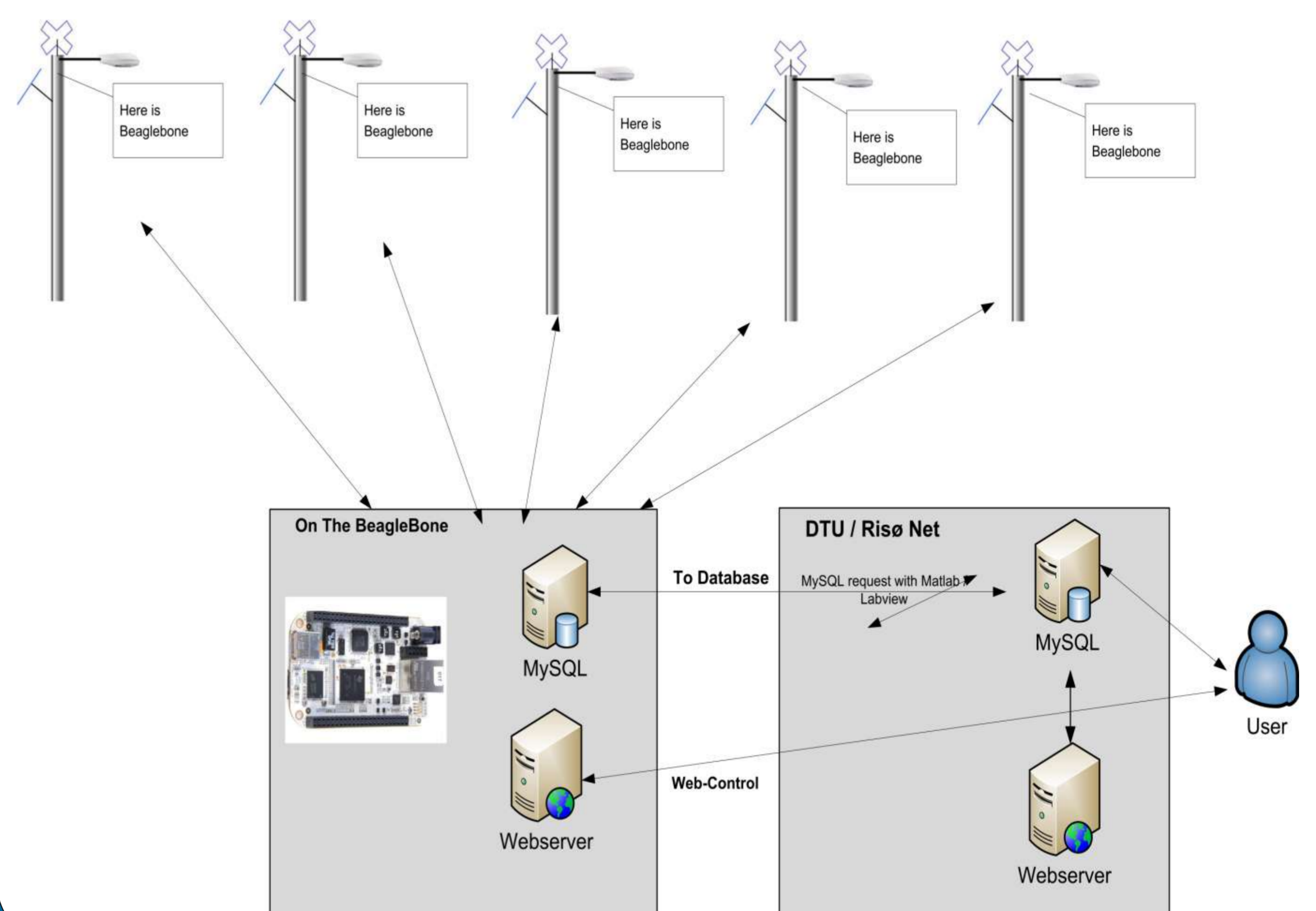
The "less" Smart Lamp system: Idea 1

- Very low power Data acquisition system.
- With Telit[3] no frequency license needed because it's using ISM-band[1]
- Easy scaling without downtime to ~100x12 sensors or more....
- Can be used for collecting data from sensors like: air quality, CO₂ level and weather.



The Smart Lamp system: Idea 2

- Offer all protocols as a "normal" Linux server in all lamps.
- Can offer wireless highspeed Internet and phone services.
- Can be used as a alternatively relay network(MESH)
- Can be used for **live feed** and collecting data from any sensors like: air quality, CO₂ level, weather & traffic cameras.



Conclusion and Outlook

A cheap compact, reliable data logger system has been developed and Installed in testing of CO₂ neutral streetlight on Risø campus. As a bonus it will offer the "smart lamp" functionalities.

References

1. ISM(Industrial, Scientific, and Medical) : http://en.wikipedia.org/wiki/ISM_band
2. BeagleBone: <http://beagleboard.org/>
3. Blog about the project : <http://blog.deadmeat.dk>
4. Telit-868 : <http://www.telit.com>