Mission objective (Kanda weather) in the University of Douala ENSET :

Main objective:

- Launching a weather balloon tether to the sensor payload to collect decentralised weather data (barometric pressure, temperature, humidity, wind speed, altitude).
- The local production of hydrogen gas from rainwater through water electrolysis powered with solar panels to launch the ballon into the lower atmosphere.

- Setting up of LoraWan communication network between balloon payload and land station Lora gateway to send the data collected to Kanda dashboard for climate change prediction.
- Provide and make accessible the weather data to the farmer and the citizens with the use of Telos blockchain.

Specific objective:

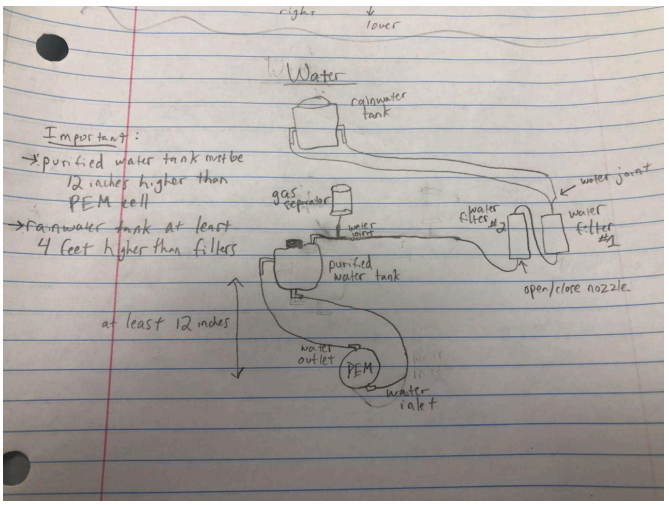
- De-ionising rainwater, filtering and hydrolysing H2O
- Storage of hydrogen gas in a tank to be used to inflate the balloon
- Using LoRa gateway for communication between payload sensors and LoRa receiver
- Interphase for viewing data (Kanada weather site)

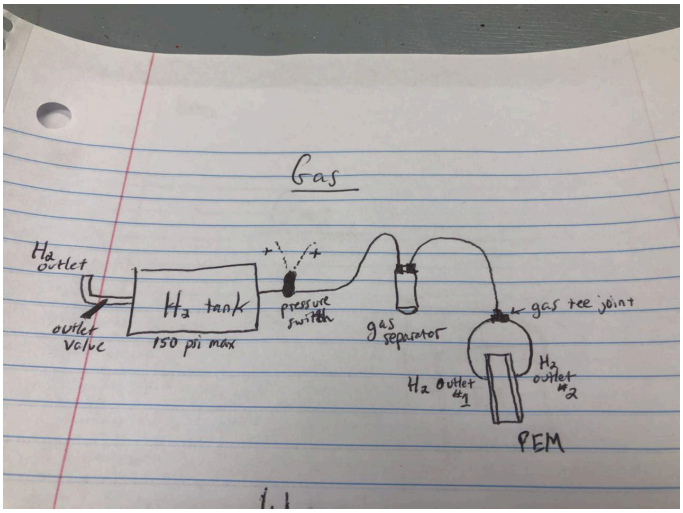
Description of project:

This project aims to Predict climatic change through decentralized weather data through Lora communication from the sensor payload tether to an inflated hydrogen balloon launch at the lower atmosphere and make it available to the stakeholders (Famer, population, aircraft and metrology companies).

The production process of hydrogen is done by a hybrid system (solar and the grid). The rain collected from the solar roof is sent to filters for de-ionisation which is then sent to a chamber. This chamber holding purified water from the filters is fed into a PEM. One end of PEM feeds O2 back to the purified chamber water, and another contains H2 which is sent to a gas separator and then sent to a tank for storage. Energy to power the PEM cell can either be gotten from the PV solar panel or the grid depending on the user's choice of operation or under/good performance of the solar system.

Now the gas in the tank is used to inflate the balloon and a payload attached to it. Since hydrogen is less dense than air, it will move toward the sky. Helium gas can also be used in place of hydrogen but the cost of helium is expensive and not very easy to obtain.





Before the balloon is launched/let go, the connection between the transmitter and receiver via the LoRa gateway is established. In the air, we can obtain decentralised data like wind speed, altitude, temperature, humidity, GPS location and Atmospheric pressure. All this data collected is in real-time. The data is then fed into a system on the Kanda site for accurate metrological predictions. The GPS helps us locate the payload when the balloon burst, they burst may be due to leaks or Atmospheric pressure.

Next step:

- Setting the LoraWan IOT (Internet of things) Connectivity between the sensor payload from the balloon and the Lora gateway station to collect data and send it through the Kanda dashboard.
- Using machine learning to predict the real-time climatic change and have 12-hour rain forecasts for the city.

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