<https://docs.google.com/spreadsheets/d/1wSpJeaEwZ_kifCaJiY3F_85ApfrcOTSFiHrFFw8qZqc/edit?usp=sharing>  
For each project in the next 1-2 weeks before the Xmas holiday, it will be great if you could prepare a 1-2 page doc that will include

project scope,

project goal/objectives,

project method,

and

a timeline with deliveries/milestones.

MSc project: Low-carbon energy solutions for sustainability Project stage ·

Modelling of solar powered cold rooms for food preservation (Working with a company)

This project will focus on refrigeration system modelling of fridges and freezers.

Literature review of refrigeration/cooling requirements for storing food (vegetables, fruits, seafood, and other meats) during post-harvest.

Working with the partner, the student will get data of food types, storage temperature and duration, cold room sizes, and other parameters needed.

Then, build models of refrigeration systems and models of heat gains/losses of the cold room.

Run simulations and analyse results for understanding variations of refrigeration systems for varied food storage.

# Project Scope:

This project will focus on refrigeration system modelling of fridges and freezers.

# Objectives:

1. To provide a low-carbon energy solution (Solar Powered Cold Room) for food preservation.
2. To reduce the problems of post-harvest losses in fruits, vegetables and other perishable food.

# Methodology:

ColdHubs, is a “plug and play” modular, solar-powered walk-in cold room, for 24/7 off-grid storage and preservation of perishable foods.

ColdHubs, is installed in major food production and consumption centers (in markets and farms), farmers place their produce in clean plastic crates, and these plastic crates are stacked inside the cold room.

The solar-powered walk-in cold room is made of 120mm insulating cold room panels to retain cold. Energy from solar panels mounted on the rooftop of the cold room is stored in high-capacity batteries, these batteries feed an inverter which in turn feeds the refrigerating unit.

Use Data data of food types, storage temperature and duration, cold room sizes, and other parameters from a partner ( [Coldhub](https://www.coldhubs.com/) )

* To build models of refrigeration systems
* To build models of heat gains/losses of the cold room

## Available python tools:

· PVlib, solar PV system modelling,

<https://pvlib-python.readthedocs.io/en/stable/user_guide/index.html>

· CoolProp, thermal property modelling of refrigerants, <http://www.coolprop.org/>

· HeatMyHome, <https://heatmyhome.netlify.app>

# Deliveries/milestones:

The project will build models to simulate the performance and cost of various technologies that aim to provide energy services to rural areas in developing countries.

* Gather and analyse data on cooling/water/energy demand.
* Build performance models of cooling/water processes.
* Build cost models of cooling/water processes.
* simulations and analyze results for understanding variations of refrigeration systems for varied food storage.

# Timeline with milestones: