I. Introduction

   A. Brief greeting and introduction of those present

   B. Overview of POWAR project and its goals

II. Project Requirements

   A. Detailed presentation on the project, focusing on technical and operational requirements

   B. Discuss the challenges faced in the existing model

   C. Clarification on key points by the team

Questions:

1. Could you provide more technical details of the existing model?
2. POWAR is a box that has some Seeed Studio Grove sensors inside:
   1. SHT-40 Temperature and Humidity
   2. Soil Moisture
   3. CO2 Sensor
3. They are connected to a Seeed Studio WIO Terminal that gets the information and send it to a server through MQTT.
   1. [Wio Terminal landing page (seeedstudio.com)](https://www.seeedstudio.com/wio-terminal)
   2. [Get Started with Wio Terminal | Seeed Studio Wiki](https://wiki.seeedstudio.com/Wio-Terminal-Getting-Started/)
   3. [Wio Terminal Classroom - YouTube](https://www.youtube.com/playlist?list=PLpH_4mf13-A0MzOdPNITVfoVBMvf7Rg9g)
   4. [Wio-Terminal-User-Manual.pdf (seeedstudio.com)](https://files.seeedstudio.com/wiki/Wio-Terminal/res/Wio-Terminal-User-Manual.pdf)
4. The information is received in a Node-Red server.
   1. [POWAR SERVER (powarsteam.com)](http://server.powarsteam.com/)
   2. [POWAR SERVER CONFIG (powarsteam.com)](http://serverconfig.powarsteam.com/)
5. The Node Red server has an interface that allows the user to get weather data from a certain city around the world. The server does some algorithmically equations to evaluate the amount of rain, sun and temperature according to the information it web scraps from the weather API data. (Open Weather Data Map API)
   1. [Сurrent weather and forecast - OpenWeatherMap](https://openweathermap.org/)
   2. [Pricing - OpenWeatherMap](https://openweathermap.org/price) (the one I use now is the free one)
6. The according to the information, it sends back some orders to control the actuators inside of the box controlled by Groove Relays and Mosfets:
   1. 12v Heat Pad
   2. 12v Ventilator (not the best cooling system)
   3. 5v Water Pump
   4. 12v Grow Lights (they could also be RGB lights)
   5. (No moisture or DE moisture system installed at the moment because of the complexity of DE moisturizing)

      2. What are the specific issues faced with the current Node-RED system and user limitations?

* Node-Red does not have a multi user login possibility, so each user would have to install a new Node Red server, either on his computer, a Raspberry Pi or a cloud server.
* The idea is that different users could use the same back end to connect different POWAR devices with a single identification code.

      3. Could you give concrete examples where advanced technical knowledge is required, making it problematic for the target audience?

* For a common user, the process of creating and administrating a node red server is not easy… getting involved with the terminal is scary for a lot of people… they see it as a hacker stuff.
* It should be as simple as connecting the device to WiFI, logging to the app and pair it (or something like that… maybe with a code or QR code or something).

III. Proposed Solution Overview

   A. Presentation on the proposed solution of developing an application and a centralized database.

   B. Discuss how the solution addresses the project's needs

   Questions:

1. Could you elaborate on the functionalities you'd like to keep in the new system?
   1. M: Weather simulation.
   2. M: Box Interior sensors visualization
   3. M: Multiple users’ connectivity.
   4. M: Actuating system within the solution and the device.
   5. S: The possibility to manually control the variables, beside the weather API so it works for other experiments. (Turn off and on the weather simulation and configure the weather variables manually)
   6. S: Options to turn on and off the actuators, and to regulate them or set schedules for them.
   7. S: Easy to use Interface.
   8. C: Instructions or documentation for the use.
   9. C: Database management, where users can upload data from their experiments with POWAR.

1. Are there any other key features you would like the application to have?
   1. W: Maybe some preset setting for certain plants like for example growing Tempeh or Mushrooms, or some predefined simulations.
   2. W: The user could maybe store some presets he likes to use them latter with a button or something.
   3. W: A place where people could add information about the plant they are going to grow and the setting they used, and also add some information of the growing process.
   4. DREAM: It could have integrated ultrasonic distance sensors or CV AI to automatically take pictures and detect how the plant is growing. This could help in the process of automatically feeding the database.
2. How do you see the comparative analysis and knowledge sharing happening with the new centralized database?
   1. I imagine in the future that schools could share their experiments and results with schools from around the world.
   2. I imagine an open database where farmers could look for a certain plant and can learn from those experiments that other people have done.
   3. I imagine AI predictive models trained with the data gathered by the experiments of POWAR.

IV. Key User Groups

   A. Discuss the expectations and needs of final users.

   B. Discuss how the proposed solution addresses users' needs.

Questions:

1. Could you tell us more about how Small-Holder Farmers, School teachers, parents, and students will interact with the system?
   1. First, we will approach the students in schools, and they are going to do certain experiments lead by their teacher to explain them some environmental science concepts with it.
   2. Beside POWAR, students will have a device that includes different sensors so they can sense their environment in different ways and do different experiments.
   3. The plants inside POWAR will also be grown in the school garden so they can compare them to the ones grown inside POWAR through scientific method.
   4. Parents could buy their kid a POWAR device to grow plants at home and experiment with them.
   5. Small Holder farmers could grow the plants they grow nowadays in their future predicted weather, to help them understand how they will be affected by climate change.

1. Do you have any initial ideas for the user interface or experience that could help make the system simpler?

Previously I have only tried to use Blynk, but because of the question, I found this others that might work.

* 1. [Blynk: a low-code IoT software platform for businesses and developers](https://blynk.io/)
  2. [Drag and drop UI builder (uibakery.io)](https://uibakery.io/drag-and-drop-ui-builder)
  3. [Ubidots - IoT industrial potente pero sencillo](https://es.ubidots.com/)
  4. <https://www.fracttal.com/>
  5. [Build an IoT Application on a Low-Code Platform | Mendix](https://www.mendix.com/building-iot-applications/)

Dor this ones, the WIO terminal has some tutorials, so I guess thay have a good integration, but I have never tried them:

a. <https://azure.microsoft.com/>

b. [Wapps - Wappsto (seluxit.com)](https://wappsto.seluxit.com/wapps/)

c. <https://cloud.google.com/iot-core>

V. Current software and required skills

   A. Go over the current software development skills and requirements

   B. Discussion on how the team's existing skills can be utilized effectively

 Questions:

1. Is the team flexible to use different programming languages or should we stick to the ones specified?
   1. As long as they work with the WIO terminal, and accomplishes what is needed, keeping it user friendly, its ok for me.

1. What level of understanding of Node-RED's is required? Should the team consider learning it comprehensively?
   1. Probably the best thing would be to change Node-Red for something else, since it does not allow to have multiple users (as far as I know).

VI. Communication Management

   A. Discuss the communication mechanisms proposed

   B. Discuss urgent outreach options available to the team

Questions:

      1. How immediate are we to expect responses on urgent issues?

      Whatsapp or the Teams group is ok for me. We can also use slack or another team management platform that you prefer.

VII. Conclusion and Forward Plan

   A. Discuss the timeline and arrange the next meetings

   B. Final clarifications and remarks

Meeting Adjournment

   A. Confirm understanding and agreement on all points

   B. Closing comments and adjournment.