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ANNEXURE VIII

STUDENT INTERNSHIP PROGRAM (SIP)

REPORT

Name of Industry:

CopperCloud IOTech

Submitted by

DURGESH KOLTE

T196003

0120170036

SCHOOL OF ELECTRICAL

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ALANDI (D.), PUNE

<u>CERTIFICATE</u>

This is to certify that the "**Student Internship Program (SIP)**" report submitted by <u>**Durgesh Kolte**</u> PRN **0120170036** is work done by him/her and is submitted during 2019-20 academic year.

Faculty Mentor   **School – Internship Coordinator**

Shridhar Khandekar   **Amit Nagrale**

School Dean

Debashish Adhikari

(Internship Certificate)

ACKNOWLEDGEMENT

I take this opportunity to record our profound gratitude and indebtedness to **Prof. Shridhar Khandekar**, School of Electrical Engineering for his inspiring guidance, valuable advises, constant encouragement and untiring supervision throughout our project work.

Finally, I would like to acknowledge and express my special thanks to **Mr. Yogesh Yewale (Industry Guide)** for guiding me through the course of time and **Mr. Abhijit Deogirikar (CEO, CopperCloud IOTech)** for patience, encouragement, support during the period of this work.

Durgesh Kolte

T196003

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1. INTRODUCTION:

CopperCloud IOTech is a start-up in Internet of Things (IoT) space, incorporated in 2018. Our primary focus is on Industrial IoT, with the objective of assisting MSMEs transition to Industry 4.0, through customized Industrial IoT solutions.

CopperCloud® also offers conventional IT services involving websites, databases, cloud services, etc.

We at CopperCloud are passionate about education, which is reflected in our strong training vertical, imparting IoT skills to faculty, students and working professionals.

Their leadership team has a collective experience in a variety of disciplines including automation technology, wireless technology, IT, embedded systems, data science, defence service, industrial administration and so on. We are committed to new and upcoming technologies with a vision to make affordable automation available to every MSME in India and beyond.

Their delivery team is a core group of dedicated technologists, specializing in embedded, IoT and data technologies, working in partnership with professional experts in allied fields of PLC, IT security, hardware design and development, ERP, etc.

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2. PROBLEM STATEMENT:

Domain: Energy

Problem statement:

Deploying IoT Solutions in hard-to-reach terrain, or where AC grid power isn't easily available.

Designing a system that can last on itself for years while updating weather information on the cloud without any human interference

3. LEARNING EXPERIENCE:

3.1 KNOWLEDGE ACQUIRED:

1. Solar + Li-ion battery powered IoT Device

2. In case of low battery, exception should be logged on cloud database

3. Recommended equipment/platforms

• ESP8266/NodeMCU

• Solar panel 8 to 12V

• TP4056 LIPO charge controller

3.2   SKILLS LEARNED:

- Basics of solar power as applied to IoT
- Design LIPO battery charging system, and integrate it with a portable solar generation unit
- Power budgeting and management on embedded platforms
- Communication protocol between IoT Embedded Device and Cloud using MQTT and JSON
- Basics of Relational Databases
- Agile methodology to execute projects

3.3   VALUES GAINED:

- Team Work
- Working on Scrum
- Problem Solving
- Approach Finalization
- Designing System
- Analysis

3.4 CHALLENGES:

SR. NO	NATURE OF WORK/TO DO	CHALLENGES
0	Scrum	NO
1	Components	NO
2	In-depth Battery	C rating
3	Charging	Timing
4	Battery Discharge	Current drop
5	Power Calculation	Components
6	Solar Panel Energy Calculation	Budget
7	Solar Panel Size	NO
8	TP4056 Charging	Amperage
9	Solar Panel Selection	Wattage
10	LiPo Battery charging Design	Voltage issue
11	AWS cloud concepts	NodeRED
12	AWS cloud Networking	NO
13	Cloud & Embedded	NO
14	NodeMCU (ESP8266)	Sleep Mode
15	NodeMCU code	Linking Cloud
16	MySQL	NO
17	Relational Database	NO

MOST CHALLENGING:

Voltage Aspect:
This is where things become interesting. By the way most ESP8266 boards are designed, one cannot read the battery voltage Vin without external components. But there is a method to detect a discharged battery indirectly, by measuring the input voltage of ESP8266 — that would be V3.3.
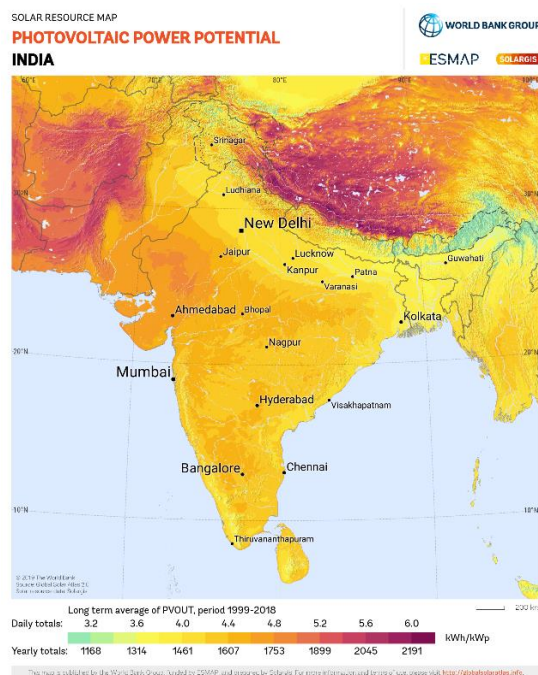
4. CONCLUSION:

Off-grid Power System is very crucial in areas of hard to reach or where frequent maintenance isn't possible. This system is carefully crafted to suit months of runtime without any human interference. The flow of system designing started with the Thermal layout of the country or region where the system would be laid. This helped in generalizing the Solar Panel Size and its specifications. Further to which the battery selection process continued which matches up to the system requirements. And considering all the offsets and weather conditions, we can call this as one of the most robust Off-grip powered or Solar powered system for any type of work.

5. BIBILOGRAPHY:

Location: **Pune**

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YouTube Link for guide to Sleep Mode:
https://youtu.be/QQrFxn6G97Y

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- https://www.youtube.com/watch?v=WdP4nVQX-j0
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