**Internship Report**

**Company Name**: PV Clean Mobility Technologies Pvt. Ltd.  
**Internship Duration**: 20th June, 2025 to 19th June, 2025  
**Intern Name**: Nitin Kumar  
**Department**: Research and Development (R&D)

**1. Introduction**

This report highlights my internship experience at PV Clean Mobility Technologies, a company dedicated to advancing sustainable and energy-efficient vehicle technologies. During this internship, I had the opportunity to explore real-world industrial applications of embedded systems, sensor integration, and rapid prototyping technologies. The program provided a practical platform to apply theoretical concepts from my academic background to ongoing research and product development.

PV Clean Mobility Technologies focuses on designing and developing advanced vehicle components and systems that align with the principles of clean energy and efficient transportation. The organization works on innovative technologies such as electric drivetrains, fuel level sensing systems, and lightweight materials for enhanced performance. Throughout the internship, I was able to interact with professionals from different departments, gaining insights into interdisciplinary collaboration and project development workflows.

My primary contributions included working on a Hall Effect IC-based fuel level sensor, performing various sensor testing and calibration tasks, and gaining hands-on experience with Fused Deposition Modeling (FDM) 3D printing. I was also involved in analyzing sensor outputs, developing circuits, and contributing to product testing and prototyping processes. The internship allowed me to develop both technical and soft skills in a highly professional environment, thereby enriching my understanding of industry standards and technological innovation.

### ****2****. Company Overview

**PV Clean Mobility Technologies Pvt. Ltd.** is an innovative company focused on clean and sustainable mobility solutions. The organization is engaged in the design, development, and manufacturing of components for electric vehicles (EVs), including battery systems, control units, and sensors. Their mission is to promote green technology by introducing advanced and reliable components that support the electrification of mobility.

### ****3. Objectives of Internship****

* To gain hands-on experience in sensor design and prototyping.
* To understand the working and integration of Hall Effect ICs in fuel sensing applications.
* To assist in the testing and development of 3D printed prototypes using FDM.
* To document findings and prepare technical reports for R&D purposes.

### ****4. Hall Effect IC-Based Fuel Level Sensor****

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* To document findings and prepare technical reports for R&D purposes

#### **4.1 Overview**

Hall Effect sensors are widely used in automotive applications for their reliability and precision. During the internship, I researched and developed a prototype fuel level sensor utilizing Hall Effect ICs. This sensor is designed to work in harsh environments and provide accurate readings of fuel levels without direct contact.

#### **4.2 Working Principle**

The Hall Effect is a phenomenon in which a voltage difference is produced across an electrical conductor transverse to an electric current in the conductor and a magnetic field perpendicular to the current. In fuel sensors, a magnet is attached to a float, and the Hall Effect IC senses the magnetic field’s strength and position, translating it into a level reading.

#### **4.3 Sensor Design Considerations**

* **IC Selection**: Various Hall Effect ICs were evaluated for sensitivity, linearity, and temperature stability.
* **Magnet Placement**: Optimal distance and orientation were tested to ensure linear sensor output.
* **Float Material**: Lightweight and fuel-resistant materials were selected to ensure accurate buoyancy and durability.

#### **4.4 Prototyping and Testing**

* Created 3D-printed sensor housing
* Integrated Hall Effect IC and magnet with the float mechanism
* Conducted tests using simulated fuel tanks with different fuel levels
* Verified output using microcontroller interfacing (Arduino/STM32)
* Calibrated sensor for non-linear tank geometries

#### **4.5 Applications and Benefits**

* Non-contact fuel level measurement
* Long operational life and resistance to contaminants
* Cost-effective solution for EVs and hybrid vehicles

### ****5. Involvement in FDM-Based Prototyping and Testing****

#### **5.1 Overview of FDM Technology**

Fused Deposition Modeling (FDM) is a 3D printing technique used to create prototypes by extruding thermoplastic filaments. My role involved assisting in the creation and testing of FDM parts for enclosures, sensor holders, and structural prototypes.

#### **5.2 Tasks Performed**

* Slicing and optimizing CAD models for 3D printing
* Handling material selection (PLA, ABS, PETG)
* Analyzing surface finish, dimensional accuracy, and mechanical strength
* Performing stress tests and thermal cycling for component validation

#### **5.3 Findings**

* ABS provided better temperature stability but had warping issues
* PLA was easier to print and more dimensionally accurate
* PETG offered a good balance between flexibility and strength

### ****6. Challenges Faced and Solutions****

* **Sensor Noise**: Encountered signal noise during sensor testing. Used filtering techniques and proper grounding to minimize.
* **Printing Defects**: Warping and layer delamination in FDM parts were addressed by adjusting print bed temperature and using adhesives.
* **Tank Geometry Calibration**: Fuel tanks were non-uniform in shape, requiring interpolation algorithms to linearize the sensor output.

### ****7. Skills Gained****

* Practical understanding of Hall Effect ICs
* Experience with microcontroller programming
* Exposure to FDM 3D printing and design optimization
* Knowledge in sensor calibration and signal processing
* Technical documentation and teamwork skills

### ****8. Conclusion****

The internship at PV Clean Mobility Technologies provided an enriching experience that significantly enhanced my practical knowledge in sensor development and prototyping. I gained in-depth exposure to real-world engineering problems and developed critical thinking and hands-on skills. The Hall Effect fuel level sensor project, in particular, allowed me to understand complex electronic-mechanical systems and contribute meaningfully to the R&D team.