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Sonargaon University (SU)

সোনারগাঁও ইউনিভার্সিটি (এসইউ)

Department of Mechanical Engineering

Sonargaon University (SU)

Welcome To The Presentation

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The Title
Of
‘LOW COST REFRIGERATION SYSTEM USING LPG’

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OUTLINE OF THE PRESENTATION

- Abstract
- Objectives
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Abstract

Refrigeration is the science of maintaining the temperature of a substance below the atmospheric temperature That is done by removing the heat from the substance that needs to be cooled. A general refrigeration system uses electricity and Chlorofluorocarbon to accomplish the task. Chlorofluorocarbon (CFC) is also contributed to the ozone depletion. As electricity is not abundant in our country, the need of an alternate to the existing system has arisen. In such case, LPG refrigeration system has proven to be an effective for remote areas such as research sites, mines, & deserts and also free of pollution. Many engineering analysis has been done in the recent years in LPG refrigeration system, but practical implication of such analysis is yet to be reported. We will investigate the performance parameters is the refrigeration effect in certain time. A LPG powered refrigeration system has been fabricated by using different components and measuring instruments. High pressure gas from LPG was regulated to low pressure and it is directly fed to the throttle valve where further drop of pressure and temperature occurs. This low temperature gas passes through the copper tube in the refrigerating chamber absorbs heat from the chamber and thus produce refrigerating effect.

Objectives

1)To Compare the important characteristics between LPG Refrigeration system and traditional refrigeration system.

2) To distinguish between the current existing refrigerator Cost and estimated cost of LPG refrigerator.

3) To The performance of existing refrigerator and LPG Refrigerator is to be compared.

4) To determine the cop of refrigerator using LPG as refrigerant

Methodology

The methodology for this project involves a systematic approach to the design and construction of a low-cost refrigeration system utilizing LPG (liquefied petroleum gas) as the refrigerant. The step-by-step process is outlined below:

- Developing / creating an idea Fabrication of a low cost refrigeration using LPG as refrigerant.
- Drawing and listing of components/materials to know which components / materials need to construct it.
- Collecting the all components / materials for construct the refrigeration system.
- Finally, we constructed this system with maintaining all safety & checked it.
- We found that its works very well.

List of Components

1. Node MCU
2. DS18B20
3. Capillary Pipe
4. LCD
5. Gas Cylinder
6. Plastic Pipe
7. Copper Pipe
8. SMPS
9. Stove
10. Cooling Chamber
11. Color
12. Soldering Items
13. DHT11
14. High Speed Regulator

Circuit Diagram

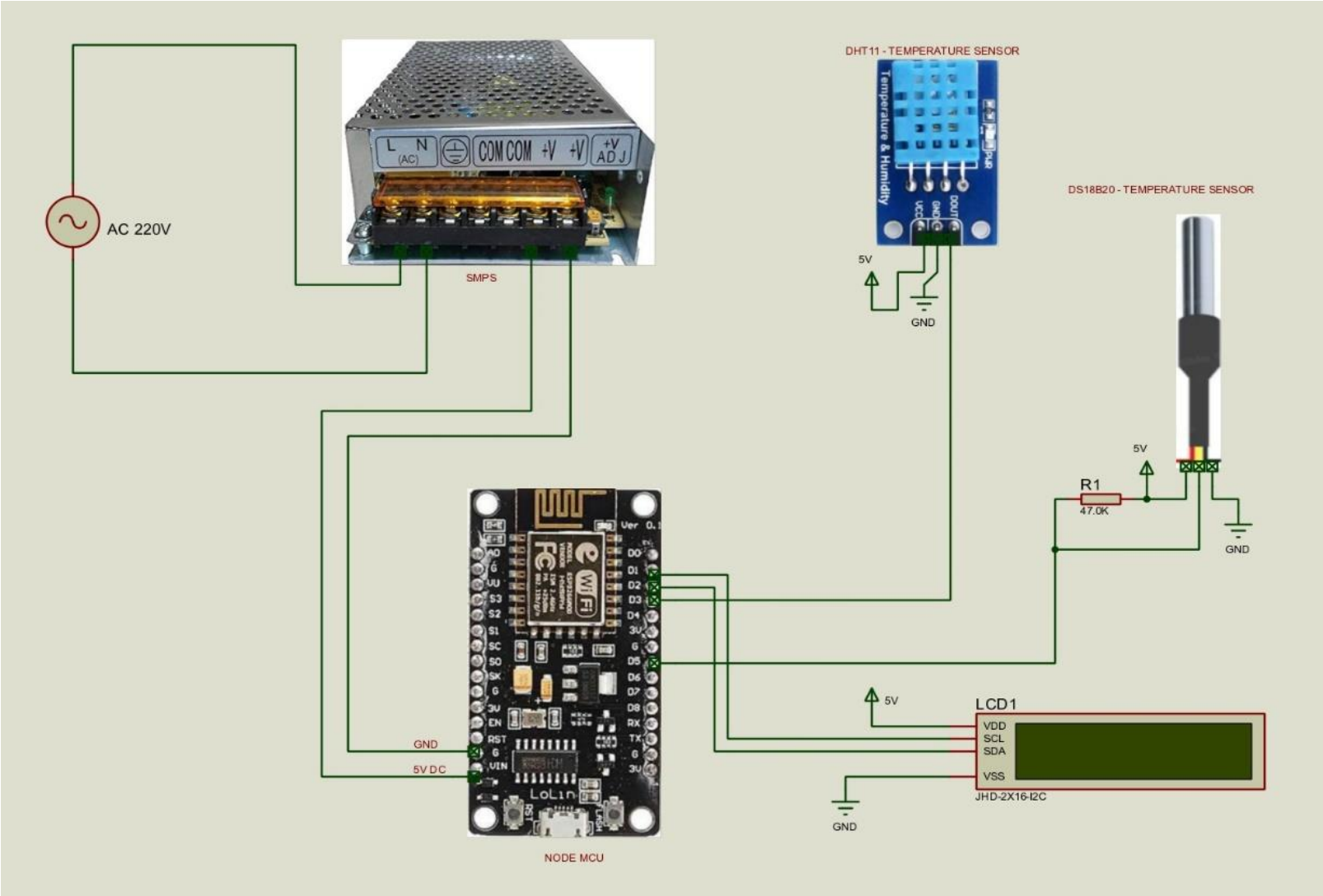


Figure: Circuit Diagram of proposed System.

Block Diagram

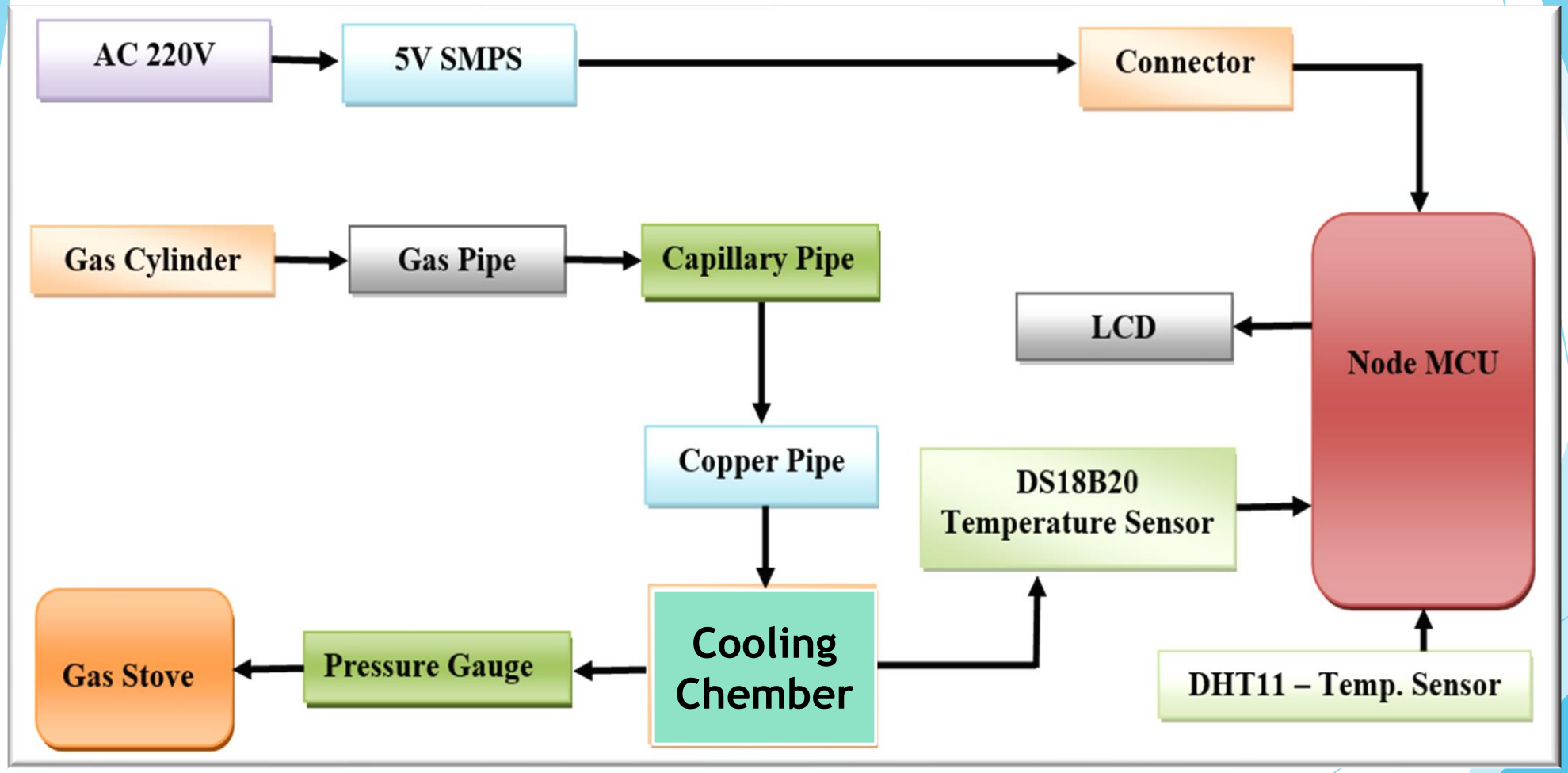


Figure: Block Diagram of Proposed System.

The Complete Prototype



Figure: Overview of Proposed System

Working Principle

Refrigeration is the science of maintaining the temperature of a substance below the atmospheric temperature That is done by removing the heat from the substance that needs to be cooled. A general refrigeration system uses electricity and Chlorofluorocarbon to accomplish the task. Chlorofluorocarbon (CFC) is also contributed to the ozone depletion. As electricity is not abundant in our country, the need of an alternate to the existing system has arisen. In such case, LPG refrigeration system has proven to be an effective for remote areas such as research sites, mines, & deserts and also free of pollution. Many engineering analysis has been done in the recent years in LPG refrigeration system, but practical implication of such analysis is yet to be reported. We will investigate the performance parameters is the refrigeration effect in certain time. A LPG powered refrigeration system has been fabricated by using different components and measuring instruments.

Result

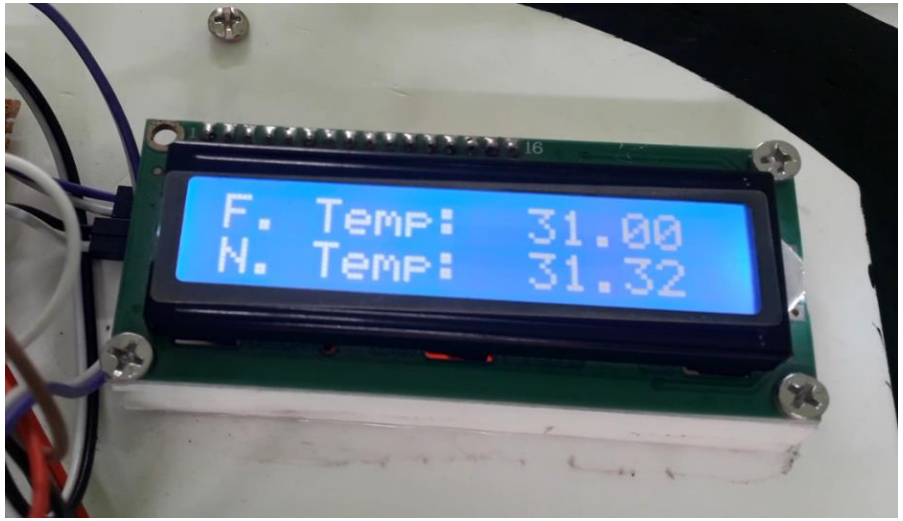


Figure: Starting Cooling (F) and Normal (N) Temperature.

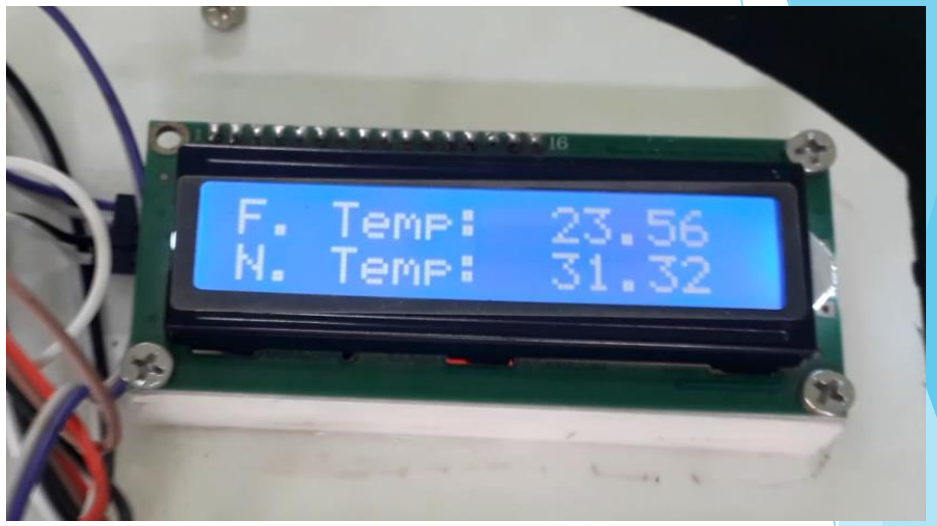


Figure: After Getting Cold, Cooling (F) and Normal (N) Temperature.

Serial No.	Time	Starting Temp. (c)	Decrease Temp.(c)	Last Temp. (c)	Cop
1	15 min.	32	5	27	5.4
2	30 min.	27	7	20	2.857
3	45 min.	20	4	16	4

Advantage

- Use of LPG as a refrigerant also improves the overall efficiency of by 10 to 20 %.
- The ozone depletion potential (ODP) of LPG is 0 and global warming potential (GWP) is 8 which is significantly negligible as compare to another refrigerant.
- A part from environment friendly, use of LPG also gives us lot of cost advantages.
- There is 60% reduction in weight of the system due to higher density of LPG.
- This cooling works when electricity is off.
- The parts are effectively silent in operation.
- Running cost is zero.
- Eliminates the compressor and condenser.

Application

Here we included some applications of this proposed system in bellow:

- It can play an important role in restaurants where continuously cooling and heating is required.
- It can be useful in remote parts where electricity is not available.
- It can be used in refineries where consumption of LPG is high.
- The system can universally be used in industrial central cooling and domestic refrigeration and air conditioning as well.
- It can be used in automobiles running on LPG or other Gaseous fuels for air conditioning
- It can be used for zero cost air-conditioning of spaces like airports, shopping malls, etc. which have their own gas turbine power-plants.

Future Work

In future we will adding IOT system for online controlling ad monitoring purpose. 10T refers to the network of interconnected devices that can communicate and exchange data with each other over the internet.



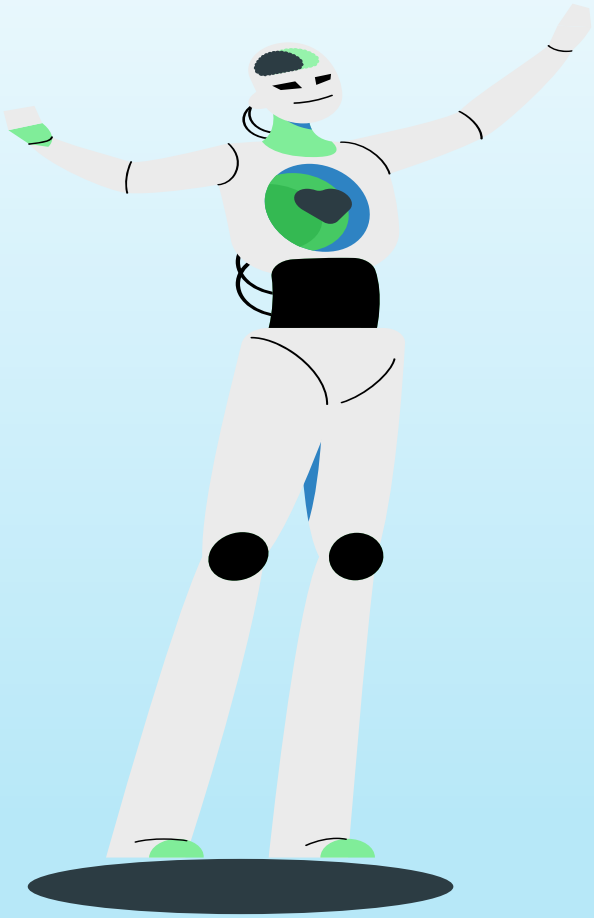
In future we will try to use it widely in our daily life. Al most every house ofBangladesh in rural area now a days has been using LPG for cooking purpose. So this project will help those people for saving electricity.

In future we will adding a gas leakage diction system. If there will be any leakage in gas pipe then it will make an alert before getting any unwanted situation.

Adapt the design for larger applications and commercial use while keeping costs low.

Conclusion

The Low-Cost Refrigeration System project successfully demonstrates an innovative approach to affordable cooling solutions by utilizing readily available materials and components. By integrating a NodeMCU, sensors, and basic refrigeration techniques, the system offers a practical and energy-efficient alternative to conventional refrigeration, particularly in resource-limited settings. While there are some limitations in terms of cooling capacity and manual operation, the project lays a strong foundation for further enhancements, including renewable energy integration and smart features. Overall, this system has the potential to provide significant benefits in areas where traditional refrigeration is not feasible, contributing to improved food preservation and quality of life.



Thank You

