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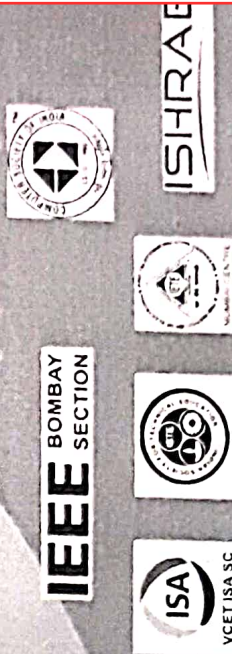
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4<sup>TH</sup> APRIL, 2020



Organized by:  
Vidyavardhini's College of  
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VNC - 2020 TASU

### About us:

Vidyavardhini means a Body committed to enhancement of Knowledge. Vidyavardhini was established as a registered society in 1970 by late Padmeshri H. G. alias Bhausaheb Vartak for the noble cause of education in rural areas.

Vidyavardhini's College of Engineering and Technology, Vasai is located on the sprawling campus of Vidyavardhini, spread over an area of 12.27 acres. It is a short, two minutes walk from Vasai Road (W) Railway Station. The college is also accessible by road from Mumbai.

Vidyavardhini Society received approval from AICTE to start the new college of Engineering & Technology with effect from July, 1994. The college is affiliated to the University of Mumbai for the four year degree program leading to the degree of Bachelor of Engineering in six branches.

### Objective of VNC 2020 TASU

Technology has always been potential tool for simplifying the way we do things. Present time demands directing the technological advancements towards addressing societal challenges such as improving health care, education environment, sanitation, agriculture, smart city, etc., VNC 2020 TASU aims to provide an opportunity to researchers, academicians, Industrialist and students to interact and share their ideologies and contributions made for social upliftment with the aid of technological advancements.

### Call for paper

We welcome submission in following area

1. Sustainable Computing
  2. High Performance Computing
  3. High Speed Networking and Information Security
  4. Software Engineering and Emerging Technologies
  5. Mathematical, Experimental, Computational and AI, IoT Techniques in Mechanical Engg.
  6. Industrial Engg., ERP, MRP, SCM
  7. Renewable Energy Technologies
  8. Pollution control and Waste Management
  9. Advances in Structural engineering
  10. Present geotechnical practices
  11. Present practices in construction management
  12. Recent developments in Instrumentation, control and automation
  13. Embedded Systems, IoT and VLSI Design
  14. Optical and Wireless Communication for NGN
  15. Antenna and Microwave Devices
- Any other relevant topics

### Publication Information

Proceedings of VNC - 2020 TASU will be published with ISBN number

1. Selected Papers will be published in International Journal of Information Technology, Published by Springer Nature, ISSN: 2511-2104 (Print Version), ISSN: 2511-2112 (Electronic Version)
2. All papers will be published in IJERT, ISSN: 2278-0181

### Important Dates:

- Submission of full length paper  
15<sup>th</sup> Feb 2020
- Paper Acceptance Notification  
22<sup>nd</sup> Feb 2020
- Submission of Final Version of Paper  
29<sup>th</sup> Feb 2020
- Registration Deadline  
5<sup>th</sup> March 2020
- PPT Submission  
20<sup>th</sup> March 2020
- Conference  
4<sup>th</sup> April 2020

### Registration Fee Details:

Category of Delegates / Authors	Indian Authors & Delegates (in INR)
Full Time Students (UG)	1,500.00
Teachers/ Research Scholars/ PG students	2,500.00
Industry	3,500.00

### Paper Submission:

Paper submission should be made strictly via Easy Chair the submission link for VNC 2020 "TASU":

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**\*Best paper award  
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# Portable biogas purification system using NaOH water scrubber, iron wool and silica gel

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**Abstract-** — Energy is an essential prerequisite for accelerated economic development and improved quality of life for citizens of any country. Due to advancements in industrial and commercial sectors in the last few years, there is an increase in demand for non-conventional resources such as crude oil, coal, and fossil fuels. This spurred for replacing the current energy resources with renewable resources. About 70% population of India lives in rural areas and the majority of them are engaged in agriculture, animal husbandry and small-scale rural industries. Biogas is generated by anaerobic digestion of biomass such as cattle dung, vegetable waste, poultry droppings, industrial wastewater, municipal solid waste, and landfill, etc. In rural areas cattle dung and vegetable waste whereas in cities and urban area municipal solid waste are available in abundant quantity, from which biogas can be generated. Biogas is constituted of different component gases, the majority of them being methane (CH<sub>4</sub>), Carbon Dioxide (CO<sub>2</sub>) with traces of Hydrogen Sulfide, and moisture. It is possible to improve the quality of biogas by removal of CO<sub>2</sub>, H<sub>2</sub>S and enriching its methane content up to the natural gas level. After methane enrichment and compression, it can be used as vehicle fuel like compressed natural gas (CNG). Any cheaper and portable method to extract carbon dioxide and hydrogen sulfide from biogas can make biogas a user-friendly viable fuel. In this paper low-cost biogas purification system is proposed and is shown that using this system we can convert raw biogas into bio CNG which can be used as a vehicular fuel.

**Keywords—** Purification, water scrubber, silica gel, iron wool, vacuum pump

## I. Introduction

Biogas is generated by anaerobic digestion of biomass and organic waste. Micro-organisms are the main living organisms that contribute towards the production of biogas. The organic waste consists of cattle dung, vegetables, sheep and poultry droppings, municipal solid waste and industrial waste water. The biogas is used as a fuel since hundreds of years. Many researches have been done already for effective generation of biogas and its usage. Similarly, immense development had been done for purification of biogas.

Biogas applications are increasing day by day due to overload consumptions of existing conventional resources. The different constituents in biogas are-

Constituents	Percentage
Methane	50-60
Carbon dioxide	30
Hydrogen Sulphide	10
Nitrogen	7
Other gas	3

The different types of biogas purification techniques are: -

### A. Bio-scrubber-

In a bio-scrubber, a liquid is allowed to flow into a adsorption column in a counter current manner. In this column the pollutants are absorbed, similar to a water scrubber. Later, the water is sent to a bioreactor for microbes to cease the pollutants. Contaminants in the biogas contact absorb and adsorb and interact with the micro-organisms. Bio-filtration are effective for treating high- and low-level hydrogen sulphide up to 50-120 ppm to 2000-4500 ppm. This results in a 89.99 % removal of H<sub>2</sub>S.

#### 1. Adsorption-

It is method of adhesion of pollutants to solid surface. When biogas is led to flow on the adsorbent bed the impurities tend to adhere to the surface and hence separating the contaminants from the main stream. Effective adsorbents have high surface area and great adhesive properties. Pressure swing adsorption (PSA) is a technique for removing carbon dioxide from methane by adsorbents. The adsorbents used mainly are activated carbon or carbon zeolites. These adsorbents are designed to be selectively permeable for specific pollutants.

#### 2. Refrigeration and Chilling-

Chilling provides a quite easy means to remove moisture from biogas. Moisture can be reduced the effectiveness of biogas to a considerable amount. Therefore, removing moisture content is a primary priority. In this technique the biogas is freezeed to a temperature of -18 to -2 degrees. In such low temperatures the moisture content in the biogas condenses and can be accumulated and collected in separate traps. The main problem in this method is removal of hydrogen sulphide before refrigeration. This is because hydrogen sulphide is responsible for corrosion of the inner

  
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**27th June, 2020**

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***Certificate of Participation***

This certificate is presented to  
**Vishwas M. Palve**  
of  
**Vidyavardhini's College of Engineering and Technology**  
for presenting paper titled  
**Portable biogas purification system using NaOH water scrubber, iron wool and silica gel**

in the Vidyavardhini's National conference 2020 "Technical Advancements for  
Social upliftments" organised by Vidyavardhini's College of Engineering and  
Technology, Vasal held on 27th June, 2020

**Dr. Vikas Gupta**  
Dean Academics  
Conference chair

**Dr. Harish Vankudre**  
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123