COMBUSTION GASIFICATION & PROPULSION LABORATORY

NEWSLETTER

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CONTENT

LAUNCH OF CGPL'S E-NEWSLETTER

CGPL's first e-newsletter was launched on 19th Feb 2021. The newsletter was launched by Prof. Govindan Rangarajan, Director, IISc in the presence of Dr Ramakumar, Director– R&D, IOCL, Prof. Dasappa, Chairman, ICER and other senior colleagues from IISc.

The e-newsletter will cover the current trends and technologies in the realm of hydrogen energy with a special focus on green hydrogen among others. CGPL has always been an advocate for green hydrogen technology, specifically biomass gasification. Through this monthly e-newsletter, CGPL aims to create better awareness and understanding in the domain of hydrogen by bringing prime news on hydrogen technologies and developments from across the world to its readers. The e-newsletter will also feature articles from contributors across sectors who are working towards bringing the hydrogen economy to fruition.

"...we aim to put India on the global map as a nation that is self-reliant in using its resources and indigenous technologies to satiate its energy demand sustainably

-Prof. S. Dasappa, Chairman, ICER

FROM THE DESK

Combustion Gasification and Propulsion Laboratory (CGPL) at the Indian Institute of Science (IISc), was established to meet the unmet energy demand. The research focus at CGPL has always been in areas of combustion science which has led to addressing one of the major resources that the country possesses – Biomass. Efficient use of biomass through indigenous technologies has always been our forte to serve the community at large. At the onset, CGPL has developed techniques for gasifying a wide range of biomass including agro and forest residues. These techniques have been perfected into small independent power plants, which could serve thermal and electricity needs of industry or rural society.

With the world currently moving towards a low-carbon economy, CGPL is making strides in hydrogen by carrying out robust demonstrations of its novel, oxy-steam gasification system. This gasifier is fuel agnostic and can be exploited to generate high-purity H_2 from multiple sources, rendering it a fitting technology to meet Indian's hydrogen demands.

Consequently, CGPL has identified the need to create awareness among the general public on a range of factors about existing hydrogen technologies. We plan to accomplish the same through this e-newsletter, while simultaneously setting a level playing field for the key players in the hydrogen economy.

Our objective remains to efficiently utilize the resources at hand and through achieving this objective, we aim to put India on the global map as a nation that is self-reliant in using its resources and indigenous technologies to satiate its energy demand sustainably. As we move forward, CGPL will focus on materializing its objective while actively engaging the society on aspects pertaining to hydrogen from a national and international perspective.

OIL GIANTS BETTING ON GREEN H_2 AS FUEL OF FUTURE

Hydrogen from fossil fuels has been a production route for decades, but with countries focus on a low carbon economy, green hydrogen is gaining momentum across the globe. This opens numerous economic opportunities for developing countries with good renewable energy resources to produce green hydrogen locally while increasing energy security by reducing exposure to oil price volatility and supply disruptions.

India has made a timely jump into the bandwagon through the announcement of its National Hydrogen Mission, which is to be officially launched. Presenting the 2021-2022 Union Budget of India, the government has announced its plan to produce green hydrogen from the vast renewable sources and allocated a budget for the same.

Along with, oil giants across the world are also shifting their efforts to green hydrogen production. Shell has been a front runner in the hydrogen economy, with the ultimate goal to produce green hydrogen, through electrolysis, using renewable power such as wind and solar. In Germany, Shell is working on 10 MW scale electrolysers that use advanced proton exchange membrane (PEM) technology and aim at producing 1,300 tonnes of hydrogen per year. It is also working on multiple projects in the Netherlands as part of a consortium with Eneco, Gasunie and Groningen Seaports, targeted at building the largest green hydrogen project in the North Sea.

BP and offshore wind giant, Ørsted established a partnership to develop an industrial-scale hydrogen electrolyser project in Germany, last November. Italy's oil and gas major Eni and utility giant Enel also announced that they would work together to develop green hydrogen projects.

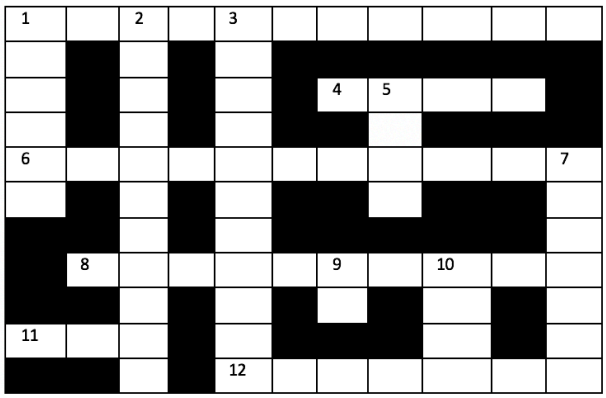
Indian Oil Corporation plans on setting up five hydrogen pilot plants across the country to test various pathways for green hydrogen production. Dr SSV Ramakumar, Director (R&D) said that the hydrogen produced from these plants will be utilized to run buses along iconic routes.

Total, one of the largest oil-producing companies in the world intends to produce large scale green hydrogen only using solar power. Chairman, Patrick Pouyanné of Total, acknowledged the challenges that persist in lowering the cost of clean hydrogen to make it commercially viable but also noted that LNG was at a similar pace decades ago before becoming a major industry and trade commodity today. Total and Engie are in mutual agreement to design, develop, build and operate France's largest green hydrogen facility and have applied for subsidies to take forward this mission.

Total is the latest oil company joining the wagon to develop a green hydrogen economy as part of its new strategy and net-zero agenda.

Source: Economic Times, Oil Price, ESMAP

TEST YOUR KNOWLEDGE



CLUES (DOWN):

1. Gasification of coal/biomass yields a mixture of gases, known as _____
2. Energy from light and heat source
3. Move on from fossil fuels
5. Electricity network
7. Environment
9. Like your mobile phone, all you need is a charging station
10. Type of crystalline solar cell

CLUES (ACROSS):

1. Responsible use of natural resources to sustain future generations
4. This newsletter is presented to you by _____
6. Farming by-product
8. Energy from beneath
11. Economical compared to petrol, more potent GHG than CO_2
12. Growth, consumption, GDP

*Answers will be posted in the next edition

- Contributed by Gautham SG & Ashray US, CGPL

DECODING THE HYDROGEN COLOUR CODES

Did you know? Even though hydrogen is a colorless gas it has various color codes to identify its source or the kind of technology used to produce it.

Green H_2

Green H_2 production pathway is called so due to net-zero carbon emissions, E.g.: biomass gasification and electrolysis via renewable electricity

Grey H_2

Grey H_2 is produced from fossil fuels, mostly via steam methane reforming and the CO_2 produced during the process is released into the atmosphere

Blue H_2

Blue H_2 is produced from natural gas via steam reforming but the CO_2 emissions are captured and stored underground or in abandoned reservoirs

Purple H_2

Purple H_2 is produced through combined chemo-thermal electrolysis, splitting of water by using nuclear power and heat

Yellow H_2

Yellow H_2 is produced via electrolysis where the energy source is either solar power or of mixed origin i.e. mix of renewable and fossil energy flowing through the grid

Pink H_2

Pink H_2 refers to the hydrogen generated via electrolysis of water, using the electricity sourced from nuclear power plant

Turquoise H_2

Turquoise H_2 is produced via methane pyrolysis, where it splits methane to hydrogen and solid carbon (that can be stored), making it comparatively low-carbon to Grey H_2

Black or Brown H_2

Black or Brown H_2 refers to hydrogen produced via coal gasification, which is highly polluting in nature and releases CO_2 and CO as by-products into the atmosphere

White H_2

White H_2 refers to the naturally-occurring geological hydrogen found in underground deposits and created through fracking

Source: H_2 Bulletin, Enapter

INTERNATIONAL HYDROGEN EVENTS

World Online Conference on Sustainable Technologies – WOCST (Online)	March 17 to 19, 2021
Hydrogen Online Workshop (HOW) (Online)	March 25, 2021
Hydrogen + Fuel Cells Europe (Online)	April 12 to 16, 2021

For more information: https://www.h2-international.com/events/

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