Technology to convert CO2 to Bio-Diesel and Omega-3 Fatty Acids

New Delhi, Dec 18: IndianOil and LanzaTech (USA) jointly hosted a virtual global media meet on the theme "Circular Economy Vision – CO2 Valorization" to share details about the collaboration of two companies for a CO2 project and related vision of the future, where carbon turns from liability to a sustainable opportunity for all.

Mr Tarun Kapoor, Secretary, Ministry of Petroleum & Natural Gas, Dr Renu Swarup, Secretary, Department of Biotechnology (DBT), Mr S M Vaidya, Chairman, Indian Oil, Dr Jennifer Holmgren, CEO, LanzaTech and Dr S S V Ramakumar, Director (R&D), Indian Oil, attended this event.

Addressing the media, Mr Tarun Kapoor, Secretary, MoP&NG said "We are very keen on biofuels, and while a lot is happening in the area of ethanol and biofuel, we are looking for technologies that would enable sustainable and economically viable production of biodiesel. The collaboration between DBT-IndianOil and Lanzatech offers a great opportunity, and we look forward to their success". Mr Kapoor also complimented the role of IndianOil R&D Centre in developing indigenous technologies for a sustainable and greener future.

While elaborating on the novel technology, Mr S M Vaidya, Chairman, IndianOil said "The technology of converting CO2 to lipids, developed in collaboration with LanzaTech, promises to be pathbreaking for sustainable production of biodiesel & high-value Omega-3 fatty acids, through carbon recycling. This novel technology will bring in the dual benefits of increased access to green energy and affordable nutrition to all."

Speaking on occasion, Dr Renu Swarup, Secretary DBT remarked, "We are proud to have set up the DBT-IndianOil R&D centre as it combines the expertise of two strong technological groups. In the last few years, this centre has set examples of excellence by bringing out several novel technologies."

Dr S S V Ramakumar, Director (R&D) and Board Member, IndianOil Corporation, commented "This centre houses the world's first integrated pilot plant combining two scientifically challenging aerobic and anaerobic biotech processes. The initial pilot plant results are optimistic, and significantly good translation has been achieved from lab to pilot scale. These results evoked enormous enthusiasm amongst the global oil & gas sector."

"LanzaTech and the team from IOC-DBT have shown that we can take CO2, a liability for our planet, and combine it with 100% renewable hydrogen to create multiple products that we need and use every day," LanzaTech CEO Dr Jennifer Holmgren said. "Single-use carbon
must be a thing of the past. How can we afford to waste it, when we can make sustainable food, chemicals and fuels? We can't go back now!"

A cutting edge carbon recycling technology has been developed over the last six years in India, that uses two primary ingredients, CO2 and H2, to produce sustainable fuels, chemicals and food for our daily lives. The DBT- IOC Centre for Advanced Bio-Energy Research (an entity co-funded by India’s Department of Biotechnology and IndianOil Corporation Limited, and carbon recycling company, LanzaTech, have been working on this platform since 2014 when they first demonstrated production of omega-3 fatty acids from CO2. Together, they have integrated two cutting edge technologies to enable direct conversion of CO2 to value-added products.

Conversion of CO2 requires an energy source, such as the sun for plants or electricity or hydrogen. Using electricity or hydrogen only makes economic and environmental sense when 100% of renewable electricity sources are used. That means that this technology will benefit from the continued price reductions as capacity increases for renewable electricity.

Green hydrogen is produced with low-cost renewable power and zero emissions and plays a crucial part in CO2 conversion. India is currently on track to exceed its targets for renewable power generation capacity by 2030, with the levelized cost of solar power generation falling below the price of coal in 2018, making this an ideal location for the scale-up of this CO2 platform.

This work builds on LanzaTech's existing commercial experience in converting industrial emissions into sustainable fuels (including aviation fuel) and chemicals for consumer goods.

Details about the DBT-IOC Lanzatech Pilot Plant:

The DBT-IOC Centre has put up the world's first pilot facility at IndianOil R&D, Faridabad to sequester about 10 kg/day of CO2. This technology also has wide recognition including US, EU & Japan patents. IndianOil & LanzaTech bagged the Game Changer Company of the year award instituted by (erstwhile) Petrofed in the year 2015 for this novel integrated process.

Currently, most of the production of Omega-3 fatty acid esters is from fish oil which uses enormous quantities of wild fish as feed, contributing to an overfishing crisis and threatening global food security & biodiversity. By the year 2025, the market for Omega-3 fatty acid esters derived products is projected at about 100 thousand tons per annum (~ US$ 57 billion). Commercial grade DHA esters price ranges from the US $500-$1200 per kg depending upon its purity.

This novel 3rd Generation biofuel technology has demonstrated the tremendous potential of CO2 sequestration /carbon recycling. This technology is expected to create a platform that can produce sustainable food and fuels economically and at commercial scale. This disruptive technology is expected to give IndianOil a distinct lead over the competition, not only in reducing carbon emissions but also producing high-value products such as DHA and Biodiesel.

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