



## **Indian Oil and LanzaTech Sign a Statement of Intent to Construct World's First Refinery Off Gas-to-Ethanol Production Facility in India**

**(Istanbul July 10<sup>th</sup> 2017)** Indian Oil Corporation Limited (IndianOil), India's flagship national oil company and, LanzaTech, carbon recycling company, have signed a Statement of Intent to construct the world's first refinery off gas-to-bioethanol production facility in India.

LanzaTech has developed a gas fermentation process to make fuels and chemicals. Instead of sugars and yeast, the company uses a biological catalyst to ferment waste gas emissions. The large volume of waste gas produced at industrial facilities such as refineries cannot be stored or transported; rather it must be combusted to make power locally and emitted as carbon dioxide (CO<sub>2</sub>). Power can be carbon-free, and in India today, the cost of renewable power has fallen below the cost of coal, accelerating the transition to a carbon-free grid. LanzaTech's technology allows refineries to divert waste gases from the grid, supporting the transition to fully renewable power while recycling this carbon into liquid fuels and petrochemicals.

India is adopting a cleaner and greener economic growth pathway today, with the Government running one of the largest renewable capacity expansion programmes in the world. The implementation of the National Smart Grid Mission, along with new programmes for increasing energy capacities from wind and waste conversion, are key elements of this vision. This vision is inextricably linked to the principle of 'need-based consumption' which follows the need to maximise on existing resources and decarbonise everyday activities.

For liquid fuels, this is highlighted by targets initiated by the Ministry of Petroleum & Natural Gas to increase the supply of ethanol-blended petrol (E10) to all parts of the country. IndianOil is aligned with this Ministerial vision and is working to both reduce its overall emissions and to improve refinery yields. For this reason, IndianOil has selected the LanzaTech technology which enables the beneficial reuse of carbon-rich off-gases for the production of ethanol. The ethanol produced from the recycling of refinery off-gases is expected to have a greenhouse gas emissions savings of over 70 per cent compared to conventional gasoline.

The basic engineering for the 40 million litres (35 K MTA) per annum demonstration facility will begin later this year for installation at IndianOil's Panipat Refinery in Hayrana, India at an

estimated cost of 350 crore rupees (USD 55 Million). It will be integrated into existing site infrastructure and will be LanzaTech's first project capturing refinery off-gases. LanzaTech's first commercial facility converting waste emissions from steel production to ethanol will come online in China in late 2017.

"India is on track to exceed its Paris commitments," said India's Minister of Petroleum and Natural Gas, Mr. Dharmendra Pradhan. "This is thanks to investment in novel low-carbon technologies such as this project between IndianOil and LanzaTech. It is promising to see carbon turned from a liability into an opportunity, where we can reduce emissions, maximise resources and decarbonise our economy."

"Innovation is one of IndianOil's core values as evidenced by our continued investment in our R&D and engineering teams," said Mr. Sanjiv Singh, Chairman IndianOil. "Innovation helps us learn and grow and this project at the Panipat Refinery enables us to continue to move forward with our commitment to build a strong sustainable business that demonstrates concern for society and the environment. The biofuels we will be able to produce will support the requirements for motor spirit blends set by the Government of India while enabling IndianOil to add value while reducing its emissions."

"India is leading a transformational shift which balances industrial growth with the needs of society and the environment," said Dr Jennifer Holmgren, CEO of LanzaTech. "Changes in the energy paradigm pose a serious challenge for energy companies but IndianOil is taking the challenge as an opportunity. They are leading the next generation of refiners as they diversify India's energy sources and explore alternative ways to meet the country's energy needs, sustain economic growth and alleviate energy poverty. We are very proud to be working with IndianOil as it plans the first deployment of LanzaTech technology in one of its major refineries, demonstrating the broad applicability of emissions recycling across industrial sectors, beyond steel."

The potential impact of using off-gases from the refining sector in India is considerable. India would be able to produce 40-50 KMTA of ethanol per refinery while saving about 1 million tonnes of CO<sub>2</sub> per annum. This is the equivalent emissions savings as taking 850,000 cars off the road in India each year.

For more information about Indian Oil Corporation please visit: <https://www.iocl.com>

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