

Net-zero fuel

Ethanol from CO₂ can address energy needs

THOUGH global carbon emissions have plateaued over the last two years—this is mainly due to slowdown in China, the largest carbon dioxide emitter—they are yet to reach a peak, given that demand from developing economies, like India is growing. With the world still emitting over 35 billion tonnes of carbon via fossil fuels, there is little that can be done in terms of signing energy pacts, but researchers at the Oak Ridge National Laboratory in Tennessee have discovered a way to curb global emissions from surging by using carbon dioxide to produce energy. According to a paper published in *Chemistry Select*, Oak Ridge team was successfully able to use carbon to produce ethanol, a bio-fuel used for blending with petrol. While this is not the first attempt to use artificial photosynthesis, University of Berkley and Chicago have both made this breakthrough, what differentiates Oak Ridge research is the low-cost solution to producing the fuel. Unlike other experiments, which require various catalysts, the Oak Ridge team was able to achieve an efficiency of 63% while producing ethanol at room temperature by using a single catalyst—copper nano-particles—along with electricity.

Though the solution may not help in reducing carbon emissions—the end product of ethanol combustion would still be carbon dioxide—it would create a net zero impact as the end-product could again be synthesised to produce energy. More important, it would reduce the cost of ethanol, which is currently synthesised from corn or sugarcane. Ethanol though a cleaner fuel than petrol, produces less energy leading to a higher consumption. Thus, fuel with more ethanol blend gets consumed more than pure gasoline. At a time when ethanol prices have been more than gasoline—according to Chicago mercantile exchange, ethanol's settlement for November was at \$1.65 per gallon as compared to \$1.50 of gasoline—it becomes more expensive to blend ethanol. With a reduction in prices, countries like India can easily achieve their targets of blending ethanol without worrying about putting more crop for producing fuel. Moreover, it can also lead to efficient utilisation of electricity where excess capacity can be used to produce ethanol and converted back into energy whenever needed. While countries will still have to reduce their carbon emissions, carbon-ethanol can be a step in that direction.