Turning Trash into Treasure
How Indian Scientists are Transforming Waste into Clean Energy

INDIA'S cities are facing a growing problem of mountains of garbage piling up. A big part of this waste is food scraps, vegetable peels, and other organic matter. Not only does this waste take up valuable space, but it also releases harmful gases like methane when it rots in landfills, harming the environment.

But what if we could turn this trash into treasure? This is what exactly a team of scientists at the CSIR-Indian Institute of Chemical Technology (CSIR-IICT), Hyderabad, has achieved with a ground-breaking technology called the Anaerobic Gas Lift Reactor (AGR).

What is the AGR Technology?

Imagine a special tank where organic waste is mixed with tiny living things called microbes. These microbes work together to break down the waste, just the way they do in nature. But the AGR is special because it creates the perfect conditions for these microbes to work efficiently.

- **Turning Waste into Gas:** through this process, the waste is transformed into biogas, a clean-burning gas that can be used for cooking, powering generators, or even heating homes.

10 ton/day biogas plant based on AGR technology at the Bowenpally Vegetable Market Yard

- **Creating Fertilizer:** the leftover material from this process is a rich fertilizer that can be used to nourish crops, helping farmers grow more food.

The Science behind AGR Technology

The AGR technology is based on anaerobic digestion, a natural process in which microorganisms break down organic matter in the absence of oxygen. The AGR system consists of a reactor vessel where organic waste is fed into the system and mixed with microorganisms. The microorganisms break down the organic waste, producing biogas, a mixture of methane and carbon dioxide.

5 ton/day biogas plant at the Jawahar Nagar MSW Dump yard in Hyderabad

The AGR technology has several advantages over traditional waste management practices. It is a decentralised system, meaning that it can be set up at the source of waste generation, reducing the need for transportation and disposal. It is also a scalable technology, suitable for small-scale applications, such as household waste management, as well as large-scale applications, such as municipal waste management.