



Sustainable Decarbonization through Circular Bio-Economy

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In an exclusive in-person interview with MittraVinda Ranjan of Chemical Engineering World, Pramod Chaudhari threw light on Praj's endeavor in biofuel and bio-economy sector. He spoke about early days of his entrepreneurial journey, company's market positioning in global context, present and upcoming projects, research and development initiatives, as well as the way-forward.



Advancements in agro-processing domain would be a socio-economic enabler.

Tell us about your inclination towards agro processing technologies that were not as developed in the early eighties in our country when you started your entrepreneurial journey.

Since my IIT days, I was very inclined towards agro processing and strongly believed that advancements in this domain would be a socio-economic enabler. Besides providing additional revenue stream for farmers and creating jobs for rural youth, agro processing could provide a much-needed fillip to the rural economy, and country at large. After my education, I obtained valuable experience by working with multinationals, and then began looking for entrepreneurship opportunities. I was familiar with the sugar industry and aware that sugar factories are usually located far from cities. Many sugar factory owners lacked exposure to technology that could create value from waste molasses generated in the manufacturing process. My technical expertise and commercial acumen convinced me that to secure our future energy needs, the way ahead was sustainable decarbonization through a circular bioeconomy.

This was around the time when the concept of using biofuels was gaining prominence in Brazil and the USA. The concept of producing alcohol and ethanol as co-products from molasses was a new one which caught my attention. I was convinced it could be revolutionary for the sugar industry and evolve as an important source of renewable energy. For the first 15 years, Praj concentrated on producing alcohol from molasses and converting alcohol to ethanol to be used as biofuel.

India has been highly dependent on imports of crude oil to meet the energy needs. What has been the outlook of the Indian Government towards biofuels?

While the ballooning oil import bill – India imports nearly 80 percent of its crude oil

needs – is a major concern; the alarmingly worsening air quality in NCR has cranked up the urgency to find a sustainable solution.

India has committed to a target of reducing CO₂ emissions by 33 percent by 2030 over 2005 levels. Given the carbon intensity of the transport sector, there is an urgent need to tackle this emission in a concerted fashion. The current government has a vision to produce 175 giga watts of clean energy by 2022 and reduce energy imports by 10 percent in 2022 and 50 percent by 2030. We believe the time is right to act on it.

Over the past five-six years, we have seen assertive actions by various stakeholders in line with strategic policy interventions by the government for the promotion of biofuels. This is helping us inch closer to achieve 10 percent blending of ethanol in gasoline as mandated.

Ethanol, a major contributor to the RTF (Renewable Transport Fuel) portfolio today, plays a major role in India's ethanol blending program (EBP). Currently 6 percent ethanol is blended with gasoline, and as per the National Policy on Biofuels 2018, the Government has set the target to 20 percent by 2030.

To what extent will the use of biofuels help India curb fuel imports?

Currently, India consumes about 40 MMT of CNG per year out of which 65 percent is imported and demand in India is further increasing at 15 percent CAGR. The government has introduced the progressive policy, namely, Sustainable Alternative Towards Affordable Transportation (SATAT) scheme to curb imports.

Under SATAT, the government is promoting the use of Compressed Bio Gas (CBG) as a

complimentary fuel to CNG. Produced from agri residue, CBG is an environment friendly biofuel which also facilitates energy self-reliance. The government has announced an investment of Rs 1.75 lakh crore to set up about 5000 plants to produce CBG from agri-waste, cattle dung, and municipal solid waste. This move will utilize more than 62 million metric tonnes of waste generated each year in India.

Additionally, the government has set a target to triple ethanol production in four years to save Rs. 12,000 crore in India's oil import bill by mixing ethanol in petrol.

Moreover, the mandate to switch to Euro VI is another important step for the automotive industry to increase ethanol blending. This could be done without making any changes to the existing vehicles that comply with Euro IV norms.

By partially replacing petrol and diesel with CBG as fuel, India can reduce its crude consumption by almost 15-20 percent and save around Rs. 80,000 crore. India currently incurs an import bill of Rs. 5.5 lakh crore each year.

The government has rolled out plans to support the growth of biofuels in the country and targets to increase the share of biofuels in India's energy basket. I see this move not only as a game changer for the farming community but also as an opportunity to generate employment.

What are your thoughts on plans of Government to increase EVs in the country?

Regarding EVs, the picture is evolving. There are several issues that are being debated. Some of them are on CAPEX affordability, feasibility for long distance travel, cost of battery, and most importantly, responsible disposal of battery from the environment perspective. Another point of discussion is about market penetration

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especially in rural areas and infrastructure development for charging batteries. In my view, multiple fuels will co-exist in the future.

Tell us about the foray and growth of Praj Industries in the global markets.

Praj was incorporated in 1984 with the objective to provide cutting edge solutions to the ethanol industry. Praj's journey began with a foray into providing technology solutions to the agro-based process industry and its first break came from a sugar mill in India. The in-house development of technology for starch-based feedstock paved the way for its entry into international markets.

Praj went public in 1994 and branched out in the international market with orders from Indonesia and the Philippines. We complete 25 years in the South East Asian market this year.

Praj ventured into South America at the dawn of the new millennium where it carved a niche with 100 percent market share in Colombia to fulfill the country's ethanol blending program.

Subsequently, we entered the European market with an engineering order for a grain-based plant and now have more than twenty references and many marquee customers. We commissioned UK's first bioethanol plant of 1200 KLPD (420 MLPA) in 2007.

On the back of cutting-edge technology solutions, today, Praj is truly a global player with over 750 references in 75 countries across 5 continents.

Praj is ranked 8th in the reputed Biofuel Digest list as a hottest company in the advanced bioeconomy, making it the first Asian company to make it in the top 10 ranking.

Bio refining is getting lot of attention in India now. Tell us about the projects Praj is setting up with the PSUs.

We are setting up 2nd generation (2G) integrated smart bio refineries based on our patented enfinity technology. The refineries process multiple feedstock/ biomass like corn and sugarcane residue, rice or wheat straw, various lignocellulosic biomass to produce fuel grade ethanol, bio chemicals, bio CNG, liquid CO₂, bio fertilizers, and power exported to the grid.

The first batch of four integrated bio-refinery projects are being executed in Uttar Pradesh, Haryana, Odisha, and Karnataka with four PSUs.

Internationally too, we have been receiving a positive response from many countries in Europe.

What kind of competition do you foresee in the Indian biofuel sector?

In India, this sector has somehow been overlooked by large players though there are a few small and mid-sized ones. There are hardly any structured or strong R&D driven organizations who can be considered real competition. We are strongly driven by R&D and have continued to expand our capabilities to develop complete solutions and innovative technologies for our customers.

With R&D being the backbone of Praj Industries Ltd, tell us about the initiatives taken in this space over the years.

Since the beginning of my journey, I always believed in the benefits that a business derives through organized innovation and R&D. Sustainability is at the core of Praj's solutions that are driven by technologies emanating from its state-of-the-art R&D Centre, Praj Matrix, and our world class

manufacturing facilities in India. Certified by the Department of Scientific & Industrial Research (DSIR) and GOI, the facility has bench and pilot scale facilities to validate scientific assumptions and promote rapid commercialization.

In the first phase, we set up our first R&D unit in 1991 with four or five people. The second phase started in 2002 when we became more organized to innovate and respond to the demands of our customers. The third phase has been the biggest and most transformative phase when we kicked off basic research in 2007 and incorporated basic research functionalities. An outcome of this phase is Praj becoming one of a handful of companies in the world to successfully develop and demonstrate 2nd generation ethanol technology.

We have a strong team of 90 technologists with our scientists engaged in research across green technologies for sustainability, including renewable chemicals.

What's the future for your company for bio-based technologies?

Technology and innovation are core values at Praj and I believe our strong market positioning is a result of the technology edge that creates value for our customers.

Backed by three decades of experience in bio-based solutions, Praj is expanding its Bio-Energy basket by adding CBG technology. Praj's demo plant is India's first integrated, flexible, and highly instrumented plant that tests, improves, and optimizes production of CBG from different feedstock such as biomass, press mud, variety of agri waste, paper mill pith, etc.

Praj is working with Gevo, a US-based company, to produce jet biofuels. We are adapting their technology to tropical feedstocks like molasses and agri-residue.

We are also developing renewable chemicals like Xylitol, Vitamin E, Nisin, and Oleochemicals such as Natural Vitamin E, Phytosterol, Omega 3 fatty acid, and more.