AgroSpectrum ASIA
Envisaging Future | Updating Present

How Praj plans to scale 2G ethanol, SAF and Bio-Isobutanol

14 August 2026 | Interviews

In an exclusive AgroSpectrum interview, Atul Mulay, President â?? Bioenergy, Praj Industries Ltd, outlines the next growth opportunities in 2G ethanol, sustainable aviation fuel, bio-isobutanol, CBG and green chemicals

In an exclusive *AgroSpectrum* interview, Atul Mulay, President – Bioenergy, Praj Industries Ltd, discusses the company's growth opportunities beyond E20, including bio-isobutanol, 2G ethanol, sustainable aviation fuel, CBG and green chemicals. He explains why feedstock mapping, low-carbon certification, co-product valorisation and decentralised biomass storage will determine the commercial success of India's bioenergy transition. Mulay also outlines Praj's vision of moving beyond biofuels towards an integrated bioeconomy that creates greater value from every tonne of biomass.

What is Praj's next big growth opportunity beyond E20?

E20 is a recent milestone, but Praj's involvement in India's ethanol journey began much earlier, with the development of the ecosystem around E10. Our approach has never been limited to supplying technology for individual plants. We have worked closely with the wider bioenergy ecosystem, including policymakers, fuel companies, technology partners and industry stakeholders. The ethanol programme has already helped India reduce its dependence on imported fuel and improve foreign-exchange savings. The next phase will require a broader portfolio of molecules and applications.

One important opportunity is bio-isobutanol. Praj has been working on this technology for nearly a decade. Isobutanol can be blended with diesel and has properties that make it more suitable for diesel applications than ethanol. India is currently moving towards structured isobutanol-diesel trials, including a planned 2 per cent pilot across commercial vehicles. Praj's bio-isobutanol technology is moving towards commercialisation, with the first commercial order expected during FY2027. The company is also developing the pathway from ethanol to jet fuel and has demonstrated integrated Alcohol-to-Jet technologies. Praj has worked with Axens to demonstrate ethanol-to-jet production at its SAF facility in Pune, including both ethanol and bio-isobutanol feedstock routes.

The company has also worked on biofuel applications for aviation and developed fuel for drones under the relevant US authority framework. These developments show how the ethanol ecosystem can expand into aviation, unmanned mobility, industrial fuels and other high-value applications. CBG is another important area. Praj is working on technologies for converting agricultural and organic waste into renewable gas. But the future of bioenergy will depend on feedstock. Mapping the availability, quality, seasonality and logistics of biomass is essential. Technology, innovation and scale-up will be the three pillars of the next phase. We are also developing second-generation feedstock solutions and working on technologies that can improve the economics of low-carbon molecules.

Can 2G ethanol become commercially competitive without subsidies?

Yes, but commercial competitiveness will depend on more than ethanol sales. The key is co-product valorisation. Second-generation ethanol made from agricultural residues can have a lower carbon intensity than conventional first-generation ethanol. That can create additional value in markets such as Europe, where demand for low-carbon fuels is growing and lifecycle emissions are increasingly linked to market access. However, 2G plants must be designed as integrated biorefineries. The economics can improve when producers extract value from lignin, carbon dioxide, proteins, chemicals, heat, power and other co-products rather than depending only on ethanol revenue.

Praj has been working on this approach for the past four years. The company has explored products such as distilled industrial oils and protein from rice-based feedstocks. These co-products can be used to cross-subsidise ethanol production and improve the overall financial performance of a plant. The objective is to develop a green-molecule platform rather than a single-product facility. A plant that produces ethanol, chemicals, proteins, energy and other materials can generate more value from each tonne of feedstock.

Over the next two to three years, the focus will be on commercialisation. Subsidies and capital support may be important during the early development phase, particularly because 2G plants involve high upfront costs and complex feedstock systems. But long-term competitiveness must come from technology performance, scale, carbon value and co-product revenue.

What is the biggest bottleneck in scaling India's SAF industry?

Feedstock and carbon-intensity mapping are the biggest challenges. SAF projects require large volumes of sustainable feedstock, but the industry must also be able to demonstrate the carbon footprint of that feedstock. Every tonne of biomass has an associated footprint covering cultivation, collection, transport, processing and conversion. A low-carbon feedstock can produce a more valuable fuel than a feedstock with a higher lifecycle footprint. This is why the industry must develop reliable systems for mapping and certifying carbon intensity.

Brazil has already made progress in mapping the carbon intensity of sugarcane feedstock. India will need similar systems for sugarcane, maize, rice residues, paddy straw, bagasse, Napier grass and other biomass sources. Certification and awareness will be important. Farmers, aggregators, transporters, processors and fuel producers must understand how their activities affect the final carbon score. There must also be a price differentiation mechanism. If low-carbon feedstock and high-carbon feedstock receive the same price, there will be little commercial incentive to invest in better practices. Market-based pricing will become increasingly important, but government support is still required during the early phase. Capital assistance covering up to 30 per cent of project costs can help reduce the initial investment burden and attract private capital into SAF production.

Praj's integrated SAF platform is designed to support both ethanol-to-jet and isobutanol-to-jet pathways. This flexibility is important because India will need multiple technologies and feedstocks to build a commercially resilient SAF industry.

How can India unlock its massive agricultural-residue potential for biofuels?

Agricultural residue is particularly suited to CBG and second-generation biofuel production. India has abundant biomass, but abundance alone does not create a functioning supply chain. Punjab, for example, has the potential to supply a significant share of the feedstock required for large-scale projects. The challenge is that paddy residue is available for a short period

during the harvesting season. If it is not collected, baled and stored quickly, it is either burnt or becomes difficult to recover. Storage is therefore as important as collection. India needs decentralised storage systems located close to farms and villages. These facilities can be connected with panchayats, local bodies, aggregators and CBG plants. A decentralised model can reduce transport distances and improve feedstock reliability. Instead of moving loose biomass across long distances, residues can be aggregated, processed and stored at multiple local centres before being transported to larger conversion facilities. The industry also needs digital mapping of biomass. Developers should know where feedstock is located, what quantity is available, when it can be collected, what it will cost and how far it is from the plant.

Farmers must also have a clear economic incentive. Collection systems should provide transparent payments and ensure that farmers understand the value of residues. Feedstock aggregation will not succeed if farmers are asked to change practices without receiving a dependable return. Agricultural-residue projects must also be designed around local conditions. Technologies should match the type of biomass, the climate, the logistics network and the expected end product. One standard plant design will not work equally well for every region.

Is Praj's future bigger in biofuels—or in the wider bioeconomy?

Aligning with the vision of our Founder and Chairman, Pramod Chaudhari, Biofuels are one part of our agenda on creation of bioeconomy . The larger opportunity lies in building an integrated platform for renewable fuels, chemicals, materials, proteins, energy and agricultural value creation. The vision is to use biomass more efficiently and extract maximum value from every component. Ethanol can become a feedstock for SAF, isobutanol and biochemicals. Agricultural residues can produce CBG, 2G ethanol, lignin and other products. Rice and other crops can generate protein and industrial co-products. Carbon dioxide can become a feedstock for fuels and chemicals. This is why co-product valorisation is so important. It improves the economics of biofuel plants and creates products that can compete in markets beyond energy. The future will also depend on collaboration. Farmers provide feedstock. Technology companies develop conversion systems. Fuel companies create offtake. Policymakers establish standards and incentives. Financial institutions support capital-intensive projects. Customers create demand for low-carbon products.

Praj's role is to build the technology and engineering platforms that connect these stakeholders. The company's future will therefore be defined not only by ethanol capacity, but by its ability to support the transition towards a low-carbon, circular and commercially viable bioeconomy. India has already built the foundation through ethanol blending. The next phase will require a much wider system—one that includes advanced biofuels, SAF, CBG, isobutanol, green chemicals, feedstock mapping and co-product markets. The opportunity beyond E20 is not simply to produce more fuel. It is to create more value from every tonne of biomass.

-- Suchetana Choudhury (suchetana.choudhuri@agropsectrumindia.com)