

# Manufacturing Today

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## BIOENERGY FOR BIOECONOMY

DEEPLY PASSIONATE ABOUT BIO-ECONOMY,  
**DR PRAMOD CHAUDHARI**, FOUNDER-CHAIRMAN OF  
PRAJ INDUSTRIES LIMITED TALKS ABOUT ROLE OF  
BIOMASS AND BIOENERGY IN A FUTURE BIOECONOMY.

# FUELLING THE GREEN ENERGY PATH

PRAJ INDUSTRIES, INDIA'S LARGEST BIOECONOMY TECHNOLOGY COMPANY TAKES CLIMATE CHANGE RATHER SERIOUSLY. WE SPOKE WITH **DR PRAMOD CHAUDHARI**, WHOSE PASSION AND FOCUS ON GLOBAL CARBON FOOTPRINT IS STRIKING.

BY SUJATHA VISHNURAJ

## Dr Pramod Chaudhari founded Praj Industries

in 1983 and developed it into a world-class engineering company specialising in agri-processing. As India's largest bioeconomy technology company, Praj developed technology for converting Cellulosic Biomass to 2nd Generation Renewable Fuels, BioGas and Renewable Chemicals & Materials. Praj is now executing three commercial advanced biofuel projects for Indian OMCs. Globally, Praj is one of the handfuls of companies to achieve this feat. Dr Chaudhari has been involved since the very inception of the biofuels industry in India and led the establishment of the Biofuels Cell under the Confederation of Indian Industries to accelerate the growth of the biofuel sector.

Dr. Pramod Chaudhari, the Executive Chairman of Praj Industries, in conversation with Sujatha Vishnuraj, Editor, of Manufacturing Today Publication, shares the emergence of bioeconomy via biofuels.

## What is the role of bioenergy in emerging bioeconomy?

Let's first define Bioeconomy: In simple terms, it is a knowledge economy that uses renewable natural resources to produce food, energy, products, and services. Bio-based products developed from renewable agri-resources facilitate decarbonization and carbon recycling. Bioeconomy has emerged as one of the most promising solutions as sustainable climate action. It leverages captive resources and therefore positively impacts social and environmental aspects.

Bioenergy is a renewable energy form with a lion's share in the bioeconomy. It has a critical role in the energy transition in the nation's overall energy mix. Thus, playing an important role in ushering in Bioeconomy.

## Biobased economy and the circular economy

In a traditional linear economy, the natural resources are consumed, transformed into products, and finally disposed of. On the contrary, a circular economy dwells on designing products for reuse, remanufacturing, and recycling to keep materials circulating in close loops. It focuses on extracting new resources from waste rather than scrapping them.

Bioeconomy leverages captive agri-resources. We all studied in science during school that, plants absorb carbon dioxide during photosynthesis. Goods and products made from plants, when combusted, release carbon dioxide. Therefore, the concept of circular Bioeconomy is based on a closed loop short carbon cycle. We can improve the circular economy by mainstreaming, Biofuels and Biochemicals—two main stays of Bioeconomy.

## Praj, the thought, the conceptualisation, and the actualisation.

Growing up in a rural part of India near sugar mills, I became interested in agri-processing and its potential for value creation. After a decade of field experience, I founded Praj as an agri-processing venture to facilitate inclusive growth. Sustainability has always been a core value in our business



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philosophy, which encompasses R&D, design, and deployment through our TEMPO model. We strive to strike a balance between people, planet, and profit. Praj Matrix R&D center fuels our technology-led growth, while strategic partnerships across the value chain augment our global ambitions. Today, Praj is a leading industrial biotechnology company, putting India in the top bracket of advanced bioeconomy globally. I believe in the power of innovation to make the world a better place.

#### The role of bioeconomy as sustainable climate action

Amidst a surge of climate disasters, the world has seen an increase in extreme weather events in the past two decades compared to the previous 20 years, resulting in significant economic damage and human toll. Bioeconomy, on the other hand, has emerged as a promising solution to combat climate change. With the commitment to reduce GHG emissions by 45% by 2030 and zero emissions by 2050 during the COP21 Paris Climate Summit, biofuels are seen as a crucial step towards decarbonising the transportation sector. Bio-based alternatives like bioplastics and bio-bitumen are also gaining traction in the pursuit of alternatives for fossil derivatives. Bioeconomy holds great potential for enabling decarbonisation and carbon recycling, promoting sustainable climate actions and energy transition.

#### Government policies helping India's bioeconomy sector

The Indian government has made strides in creating a favorable policy environment to promote the

growth of the bioeconomy. In June 2021, the "Roadmap for Ethanol Blending" was released, outlining a plan for 20% ethanol blending in petrol by 2025. Since the National Biofuel Policy's implementation in 2018, there has been an increase in feedstocks for ethanol production and upward revision of ethanol prices. The government aims to achieve the E20 target by FY2025, and schemes like Pradhan Mantri Jeevan Yojana and SATAT support the growth of 2G ethanol and compressed biogas plants. In the Union Budget 2023-24, green growth is prioritized for a sustainable economy. With India's robust industry ecosystem, innovative technology, and abundant bio-based feedstock, the bioeconomy is set for significant growth.

#### Praj's foray and achievements into the global business

Praj is India's leading industrial biotechnology company with a global presence in over 100 countries. Our motto of Innovate-Integrate-Deliver has enabled us to offer innovative and sustainable solutions, making Praj a pioneer in the global Bioeconomy.

Praj has achieved many milestones over the years. We helped Colombia, one of the world's most efficient sugar producers, implement their ethanol blending program by setting up all seven plants in the country. Praj's technology has been used to build approximately 10% of the world's ethanol production capacity. Praj has received numerous national and international accolades, including being named the 'Best place to work in Advanced Bioeconomy' by Biofuels Digest in 2021.

Praj has more than 300 national and international patents, and we work with leading technology companies worldwide to offer advanced solutions in the bioeconomy. Our partnerships with Gevo Inc., DVO, Sekab, Axens, and ARAI have allowed us to offer innovative solutions to our customers.

#### Renewable Chemicals and Materials

Our sustainable solutions in Renewable Chemicals and Materials (RCM) are eco-friendly and biodegradable alternatives to products made from fossil resources. Our Bio-Prism™ portfolio offers a variety of bio-industrial products including bioplastics, cellulose-lignin refinery products and specialty products. Our successful technologies include Furfural, liginosulfonates, and bio-bitumen. Our technology for producing bioplastics like Polylactic Acid (PLA) supports India's ban on single-use plastic. We are setting up a demo



plant for bioplastics at Jejuri, Pune to accelerate commercialization.

#### Can you please tell us more about the Bio-Mobility™ Platform?

Bioeconomy plays a critical role in supporting sustainable climate action. Decarbonization of the transportation sector, the second largest GHG emitter after industry, is essential. Our Bio-Mobility™ platform provides innovative technology solutions for the production of low carbon renewable transportation fuels in liquid and gaseous states for all modes of mobility, including surface, air, and marine. Praj has a 70% market share in India's overall ethanol production capacity and offers solutions for the production of 1G/2G ethanol, compressed biogas (CBG), and sustainable aviation fuels (SAF). We are also working towards establishing SAF as a low carbon fuel for the aviation industry in India.

#### Low Carbon Fuels for Aviation Industry from Praj

The aviation industry is responsible for generating 2-3% of global emissions, making it imperative to decarbonize this sector to limit global warming. Sustainable Aviation Fuel (SAF) offers a low carbon solution that has similar properties to conventional jet fuel. SAF is produced using renewable feedstocks such as biomass, sugars, starches, waste lipids and organic waste, making it a priority solution to decarbonize aviation in the near term. Praj has partnered with leading technology companies to offer innovative technologies for SAF production, including GEVO Inc. for Isobutanol production and Axens for building SAF projects in India. Praj is developing a resilient industry ecosystem to capitalize on promising opportunities in SAF and support sustainable aviation.

#### Praj Matrix playing key role in Praj growth story

Established in 1989, Praj Matrix is a state-of-the-art research and development center that serves as the innovation engine for Praj. It is certified by the Indian government's Dept. of Scientific and Industrial Research (DSIR) and has five centres of excellence that house 16 laboratories with over 90 research scientists. Praj Matrix is responsible for cutting-edge research and development in two main areas: Bio-Mobility™ platform for low carbon biofuels and BioPrism™ portfolio for renewable chemicals and materials. Its two-pronged strategy aims to increase throughput while optimizing energy and utility footprint and developing new products and solutions based on current and future market needs to ensure technology leadership. With over 300 patents, Praj



THE AVIATION INDUSTRY IS RESPONSIBLE FOR GENERATING 2-3% OF GLOBAL EMISSIONS, MAKING IT IMPERATIVE TO DECARBONIZE THIS SECTOR TO LIMIT GLOBAL WARMING. SUSTAINABLE AVIATION FUEL (SAF) OFFERS A LOW CARBON SOLUTION THAT HAS SIMILAR PROPERTIES TO CONVENTIONAL JET FUEL.

Matrix is the backbone of Praj's business.

#### Commercial priorities of Praj and the future of Bioeconomy

India has great potential for growth in the Bioeconomy due to its rich agricultural resources, and biofuels can address various economic, social, and environmental issues. Even after achieving the E20 target, India's ethanol industry is expected to remain strong, and the government is considering policy measures to ensure sustained demand for ethanol. Praj has commissioned a 2nd Gen bioethanol plant that uses agricultural waste as feedstock and is offering its 2G technology in Europe for ethanol production using forest residue. Praj is also working with technology companies to offer sustainable solutions for aviation and marine biofuels and renewable chemicals and materials, with the aim of developing technologies that are cost-effective, low-carbon, and have a positive socio-economic impact. ■