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**संपदा**  
**SAMPADA**



**Sustainability : A Key Driver for Business Growth**

**Industrial Relations Conclave 2022**

# Sustainable Development Through Renewable Chemicals and Materials



- Dr. Pramod Kumbhar

## The Need for Research And Development to Achieve Sustainability:

Wading through the deluge of debates, articles, and podcasts during the recently concluded COP26, it was striking to note that the current efforts at mitigation are merely reducing the rate of greenhouse gas (GHG) emissions. According to the World Economic forum's Global Risk Report, 2022, 5 out of the top 10 risks are related to environment. These include climate action failure, extreme weather, biodiversity loss, human environmental damage, and natural resources crisis.

The world is abuzz with themes like sustainable growth, circular economy, net-zero, carbon-neutral/negative technologies, recycling and recovery, and responsible utilization of natural resources. These themes focus on replacing petrol-based products with bio-based products wherever possible, recycling non-biodegradable materials, and using cleaner, greener technologies to make commodities or products. These give rise to global socioeconomic mega-trends related to demographic shifts, economic outlook, geopolitical issues, technological advances, and environmental challenges. Various industrial sectors respond to these mega-trends by investing in the development of green/renewable/biodegradable/non-hazardous chemicals. Research and

development help us discover and evaluate unsustainable patterns, discover sustainable alternatives, provide tools to analyze policy initiatives and develop and demonstrate cleaner technology.

## Circular Bio-economy:

It is estimated that the world sales of renewable chemicals are at \$ 60-65 billion and are likely to increase to 11% of total chemicals sales in the next 10 years to \$205-210 billion at a CAGR of 11-12%. The primary sectors of Praj's interest are plastics, paints & coatings, resins & food ingredients (25-30% of the total renewable chemical market). According to United Nations Environment Program, the global production of plastics has crossed more than three hundred million tonnes. As per the research conducted by the Center for International Environmental Law, greenhouse gas (GHG) emissions from plastic could represent 10-13 percent of the entire remaining carbon budget by 2050. According to the Fortune Business Insights report, 2021, the global plastic market is projected to grow from \$439.28 billion in 2021 to \$616.82 billion in 2028, at a CAGR of 5.0% in the forecast period, 2021-2028. As society moves towards sustainable development and a circular bio-economy, one aspect which needs urgent attention is the use of plastic and plastic-based products. With multiple functions and excellent material properties, plastic has



become an almost ubiquitous material in our economy and daily lives.

In its endeavor to create a sustainable low carbon economy, Praj has been developing and deploying technology-led innovation solutions on the principle of circular bio-economy. The circular bio-economy augurs Praj's focus on the agricultural sector contributing to the economy, environment, and society and boosting farmer livelihood.

#### **Praj's legacy in the area of sustainability**

Praj offers various sustainable technologies like cellulosic ethanol, renewable natural gas, and sustainable aviation fuel as a part of its Bio-Mobility<sup>TM</sup> platform. All these products use amply available feedstocks like cane juice/syrup/molasses & bagasse or other agri-wastes. Praj is in constant pursuit of eco-friendly solutions that consume lesser resources like water, reduce the emission of greenhouse gases and improve the profitability of our customers. Our technology solutions are also aimed toward the generation of least waste streams and also recycling of these streams either in the same process or use for the synthesis of new products. Praj balance of feedstock, technology, and product serves to gain decentralization & social relevance.

#### **Bio-Prism<sup>TM</sup> – The portfolio of Renewable Chemicals & Materials**

Praj's Bio-Prism<sup>TM</sup> portfolio encloses a

cluster of technologies to produce renewable chemicals & materials (RCM) that promise sustainability. The umbrella of RCM includes polylactic acid (PLA), polyhydroxyalkanoates (PHA), Natural Waxes, Hyaluronic acid, Vegan proteins and Bio-bitumen. Praj's R&D center, Matrix, plays a categorical role in the entire gamut of it's perspective toward RCM. Matrix boasts of 16 well-equipped laboratories: microbiology & molecular biology, bioprocess technology, process engineering & scale-up, chemical sciences (including phytochemicals), and a strong team of 90+ PhDs and technologists. Praj also has experience of quick and accurate scale-up of technologies developed at R&D and backed by a skilled team of engineers at the parent organization.

Praj's strategy in the area of RCM is anchored on driving principles focused on feedstock, technology readiness level, market entry strategy, and sustainability advantage. The strategy is primarily centered around commodity products having applications in the market sectors of plastics, resins, paints and coatings, food, and agri-supplies. The principal focus is on 'sweet polymers' i.e., polymers synthesized from sugars. End usage of these polymers can be in Plastic, Paints & Coatings, Adhesives, Construction, Automotive, Food packaging, and Electronics. Bioplastics: A greener Solution

RCMs are the key to achieving the global





Praj Matrix Facility

commitment to accelerate climate action into reality. Bioplastics are a sustainable solution to the impending plastic pollution crisis. They are produced from sustainable feedstocks. Bioplastics like polylactic acid (PLA), and polyhydroxyalkanoates (PHA) are biodegradable. They can bring a significant reduction in carbon footprint as compared to traditional oil-based plastics. Praj Matrix-R&D center with strong inter-disciplinary capabilities in the development of bio-based technologies is developing a proprietary technology to produce polyhydroxyalkanoates (PHAs) from low-cost sugars (including first & second generation), as well as, waste oils.

Bioplastics development will further consolidate Praj's vision of developing and deploying environment-friendly and sustainable solutions to make the world a better place.

The replacement of 1-5 % of plastics with bioplastics will have a significant impact on terrestrial and aquatic ecosystems thereby

improving planet & human health. Future technological developments in new bioplastic materials, improving the functionality of bioplastics, and developing the entire ecosystem around bioplastics will pave the way to a greener world. Praj with the motto of "Sustainable Decarbonization Through Circular Bioeconomy," is relentlessly working to support this global climate action plan by driving the development of the most competitive technology for bioplastics through its Bio-Prism™ portfolio.

**The use of renewable chemicals and materials in all spectra of life has become an indispensable goal globally. The development of bioplastics is a pioneering step in attaining this goal and will define the future of the circular bio-economy.**



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