



Bio-Mobility™ : Technology for Renewable Transportation Fuel

Praj Industries Ltd. is India's leading company in industrial biotechnology, globally known for its solutions offered under the unique TEMPO (technology, engineering, manufacturing, project management, operations) business model.

The company's focus over the past three decades is on environment, energy and farm-to-fuel technology solutions. True to its vision of making the world a better place, Praj continues to pursue sustainable decarbonization through circular bioeconomy by deploying its proprietary biofuel technology solutions.

Bioethanol (1G) from sugar and starch-based feedstock like B & C molasses, sugarcane juice, cassava, grain, sugarbeet, among others.

enfinity™ (2G) producing bioethanol from ligno-cellulosic residue such as bagasse, corn cob, rice straw, wheat straw, etc.

Rengas™ - Renewable Natural gas from press mud and agri-feedstock.

Ecodiesel™ - Bio-diesel from used cooking oil, palm fatty acid, palm stearin, tallow, etc. using enzymatic technology.

Marine Biofuels from lignin-based feedstock.

Sustainable Aviation Fuel (SAF) from sugars, starch and biomass.

The Bio-Mobility™ platform promotes the use of renewable resources to produce carbon neutral transportation fuel across all modes of mobility (surface, air and water).

As a part of this platform, Praj deploys its biofuel technologies for the transportation sector, thus playing a role to help mitigate the dangers of climate change.

The company's diverse portfolio offers solutions for bio-energy plants, renewable natural gas facilities, critical process equipment & skids, brewery plants, zero liquid discharge systems and high purity water systems. The company has over 750 customer references in more than 75 countries across five continents.

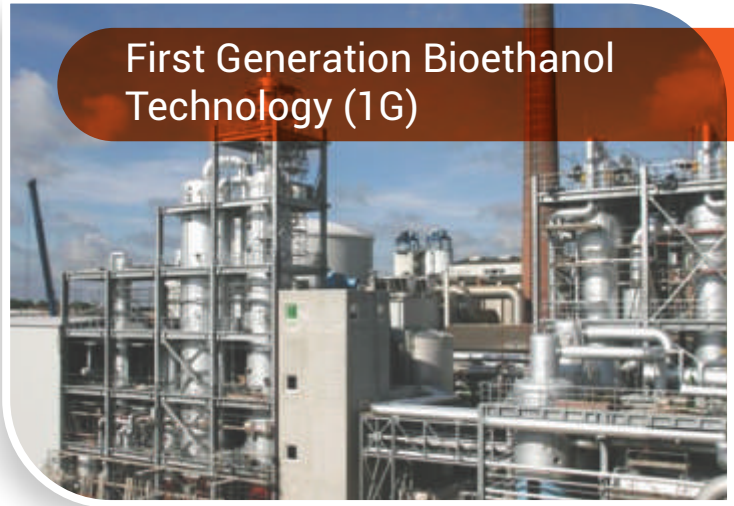
Praj is ranked 8th in the list of Top 50 Hottest companies in Advanced Bioeconomy in 2019 released by the industry's leading publication Biofuels Digest, USA. It is the first and only Asian company to make it in the top 10.



Praj has a deep understanding of processes to transform first generation agrifoodstock (sugars found in sugarcane juice and molasses, and starchy grains and tubers) into bioethanol. The company's focus on innovation has led to several patented technologies which result in -

- Product and co-product maximization.
- Flexibility to produce multiple products.
- Reduction in energy and water footprint.
- Meeting environmental norms.

First Generation Bioethanol Technology (1G)



Lignocellulosic Ethanol Technology (2G)



Praj offers end to end solutions to set up bio-refineries based on its proprietary **enfinity™**-2G lignocellulosic ethanol technology. A bio-refinery produces bioethanol and renewable chemicals by processing a wide range of agri-residue such as rice straw, wheat straw, bagasse, corn stover and corn cobs, soft wood and empty fruit bunches.

As part of commercialising **enfinity™**, Praj has successfully set up an integrated demonstration facility (12 MT/day) in India in 2017. Domain experts including senior executives from global oil majors have witnessed performance of the facility and validated the technology.

enfinity™ technology is currently being deployed at four commercial scale bio-refineries in India.

With a pool of qualified professionals and technology know-how, Praj is geared to handle O&M of biorefineries.



Praj has developed and commercialised its proprietary renewable gas technology, **RenGas™**, commissioning over 40 plants in India. Salient features of the technology include -

- Highest yield.
- Unique microbial cultures reducing operating cost.
- Plug flow reactor (PFR) digester designed in collaboration with DVO, Inc. leading to lowest operating costs.
- Zero moving parts in the reactor for highest plant uptime.
- Digestate processing into value added manure with organic certificates.

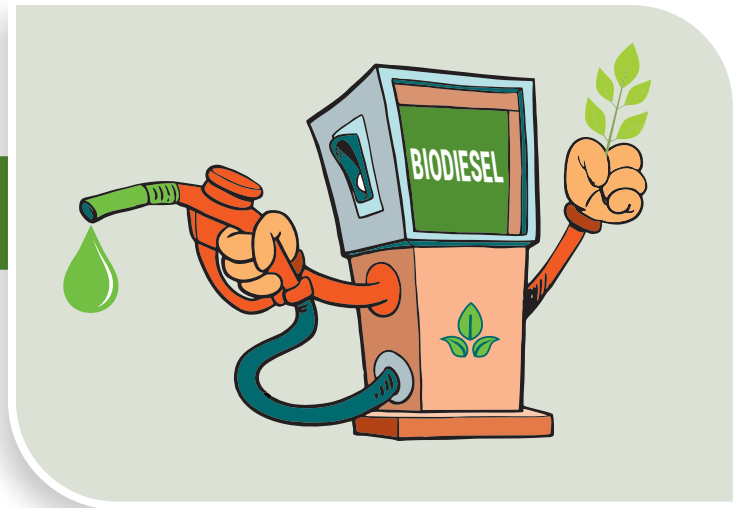
Renewable Natural Gas Technology



Bio-diesel Technology

Praj has developed Ecodiesel™ enzymatic technology to produce biodiesel from feedstock such as used cooking oil, palm fatty acid, palm stearin, tallow, etc.

Ecodiesel™ replaces conventional chemical catalytic method of producing biodiesel and meets Indian and European fuel standards. It not only offers flexibility of feedstock but also has lower cost of operations, resulting in projects that are more profitable.



Ecodiesel™



Sustainable Aviation Fuel Technology

Praj is ready to offer end to end solutions to produce sustainable aviation fuel (SAF) based on ASTM-approved Alcohol-to-Jet (ATJ) pathway, in collaboration with Gevo Inc., USA.

Praj-Gevo's innovative process uses Isobutanol produced from sugars as feedstock to produce SAF. Iso-octane is another high value co-product used as fuel for high performance driving.

Praj Integrated Biorefinery

Praj is uniquely positioned to offer a smart biorefinery that is capable of processing multi feedstock (1G & 2G) to produce multiple products (various grades of ethanol, RNG, SAF, renewable chemicals, etc.).

The refinery also produces by-products like lignosulfonates from lignin, xylitol from C5 sugars, etc., thus maximizing commercial viability while reducing GHG emission.





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