



Fuelling a Greener Tomorrow

.... With a vision to be a Leader in the European Biofuels markets delivering end-to-end, reliable, customised, value for money solutions using a flexible, innovative execution model.

The Partners



Praj is a Global Biofuels Technology Company offering cutting edge, innovative processes & systems including waste water treatment for bio-ethanol, bio-diesel & beer production.

With a reference base of over 350 plants spread across 40 countries, Praj is today acknowledged as technology and market leader in the Biofuels Industry.

Backed up by a state-of-the-art Matrix- The Innovation Centre and modern fabrication facilities near Sea ports in Western India, a dedicated team of over 700 professionals including agronomists & microbiologists, support clients across the Globe in basic & detailed engineering, project management, commissioning and after-sales service.

AKER KVAERNER™

Aker Kvaerner Netherlands BV is part of the Euro 9 billion Aker Kvaerner Group, the World leaders in the project management, design and construction of projects in industries spanning oil & gas, hydrocarbons, chemicals, pharmaceuticals, biotechnology, energy, environment etc. and provides “full life cycle of integrated services” for projects across the Globe.

Global strengths and local knowledge allows Aker Kvaerner to provide Clients with maximum assurance of cost effective engineering and construction solutions; thereby always ensuring on-time delivery of high quality projects within budgets.



BioEnergy Europa BV is a joint venture of PRAJ & AKER KVAERNER and combines the individual strengths of its founding partners to offer European customers an access to top of the line solutions for Bio-fuels plants. BioEnergy offers complete range of services that are necessary for realizing world-class Bio-fuels projects in Europe --- from project concept to commissioning & even beyond ...!

Our offerings

- ❑ Concept development
- ❑ Front End Engineering and Design Services Licence and Basic engineering Packages
- ❑ Detailed Engineering Services for Process Plant including process piping, instrumentation & controls, electricals etc
- ❑ Detailed Engineering Services for off-sites including raw material & ethanol/biodiesel storage & handling, utilities, water treatment, steam generation, electricity distribution etc
- ❑ Architectural and Civil Engineering Services for Plant including infrastructure development.
- ❑ Supply of Process Critical Equipment, distillation columns, condensers, reboilers, molecular sieve dehydration, evaporators, decanters, dryers etc.
- ❑ Skid mounted MSDH plants
- ❑ Control system including Application software
- ❑ Plant Performance Management Software
- ❑ Procurement & inspection services for various package items/systems, pumps, motors and bulk items such as valves, pipes, pipe fittings, electrical & control cables etc
- ❑ Project Management Services including logistics management
- ❑ Supervisory services for plant start-ups, commissioning and operator training.
- ❑ After Sales services
..... and, in specific cases, Lump Sum Turn Key solutions



Technologies...at a Glance

Basket of technologies for biofuels and beverage grade alcohol.



HIFERM* FERMENTATION SYSTEMS

BioEnergy offers Fermentation systems to handle a variety of raw materials:

- Grains (Wheat, Rice, Millet, Sorghum, Corn, Rye, Barley, Triticale, etc.)
- Beet (Juice/Molasses)
- Sweet Sorghum
- Sugarcane juice streams (primary, secondary, mixed, syrup, filtrate, etc.)
- Roots (Tapioca/Cassava/Mandioca)

All processes are customized for local conditions. Pre-test on raw materials ensures further optimization of the process.

Highlights of Hiferm Technology:

- High Fermentation Efficiency
- Use of granulating yeast with gravity settling and recycle, eliminating Yeast Separators in the case of sugar based feedstock.
- Recycle of stillage up to 60% or more (in the case of syrups), reducing water usage and stillage volume.

ECOFINE* DISTILLATION SYSTEMS

BioEnergy offers energy integrated distillation plants optimized for product composition (in case of beverage grade alcohol), energy consumption and maintenance needs.

- Vacuum Distillation: Ecofine TVS - Ideal for plants where low pressure steam is available from turbine.
- Pressure Vacuum Distillation : Ecofine PV- Characterized by low energy consumption as a result of heat integration with Evaporation and MSDH Plant.
- Multipressure Split Distillation: Ecofine SD - Best suited where steam pressure is relatively high. Also characterized by low energy consumption.
- Multipressure Distillation: Ecofine MPR - Employed for production of superfine or beverage grade/extra neutral alcohol.
- Atmospheric Distillation: Ecofine.





Fuel Ethanol Plants

Molecular Sieve Dehydration Systems



EcoMol Molecular Sieve Dehydration (MSDH) system offers multiple benefits including high product dryness, longevity of sieve beds, ease of operations and lowest energy consumption.

Ready-to-stand skid mounted units offer unique advantage of shortest execution time.

Optional version ECOMOL LP, is also available where steam pressure is a constraint.



EVAPORATORS

BioEnergy offers a number of options for concentration and evaporation of vinasse:

- Falling Film
- Rising Film
- Forced Circulation
- Flubex Self-cleaning, Fluidized Bed Heat Exchanger based evaporation system for scaling/fouling liquid.

These systems are partly/fully integrated with distillation plant, dehydration plant and/or DDGS Dryer for optimizing energy needs.

Wastewater Treatment and Utilization

A number of options are available for sugar and starch based distilleries/ethanol plants.

Each technology is guided by environmental concerns of individual regions. The solutions form an integral part of the entire plant including biomethanation, evaporation, DDGS/DWG, composting, vinasse boiler, etc.



Technology at a Glance

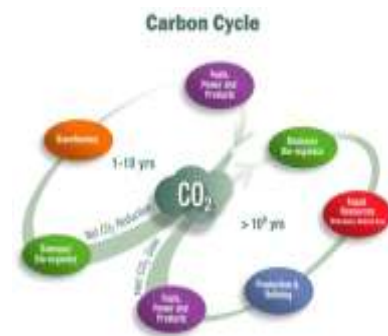
Biodiesel

Biodiesel is a renewable biofuel produced from oil seeds or any other oil source like animal fat or waste oil.

The process involves extraction of oil, esterification of free fatty acids, transesterification of triglycerides delivering crude biodiesel which is then purified into biodiesel.

BioEnergy offers several advantages for your biodiesel plant:

- ❑ Wide range of standard capacities: 100 to 500 MT/Day. Continuous operation with synchronized unit systems.
- ❑ Flexibility to operate with Multiple vegetable oil feedstocks. Modular specific pre-treatments depending on the type of feed oil.
- ❑ Choice of FFA neutralization vs. conversion to biodiesel. Proprietary High efficiency cascade transesterification process, based on reaction kinetics.
- ❑ Advanced distillation / evaporation designs - Biodiesel-glycerol separation, Biodiesel drying and methanol recovery. Reduced operations for centrifugal separations. High Biodiesel yields with minimum losses.
- ❑ Low consumption of chemicals. In-plant integration to minimize energy & fresh water needs.
- ❑ Negligible waste-water due to in-process water recycle. Conformance to ASTM/EN standards for product biodiesel.



Resources back-up

Manufacturing Facilities

Captive well equipped multiple location manufacturing units ensure faster delivery of equipment. With vast experience in metal working, the units manufacture in accordance with different regional standards and codes including CE marked equipment.



Project Management and Construction

Extensive project management experience in different



geographies qualifies BioCnergy to deliver projects against still timelines.

Global Resources for Project Execution

BioCnergy provides the largest resource base for the execution of projects:

- ❑ In India: 2,400 persons
- ❑ In Europe: 1,200 persons

Research & Development



BioCnergy delivers solutions based on studies conducted on raw materials and other factors which may impact the processes. This activity is supported by Matrix The Innovation Center which is fully equipped with pilot plants and analytical instruments.

Design & Engineering

The experienced team of engineers is one of the largest



in the industry. The teams are trained in using latest tools and deliver designs in accordance with various international standards.



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