



## MAXIMIZING VALUE THROUGH ADVANCED PROVEN TECHNOLOGIES

The subsequent announcement to the National Biofuel Policy 2018 permits the diversion of B-heavy molasses, sugarcane juice/syrup and sugar to produce ethanol in addition to C-molasses. This multi-feed stock option opens up various avenues to maximise value for ethanol producers.

Praj has supplied technology and plants based on various sugary streams around the globe which are successfully being operated over the past two decades.

The combination of right feedstock based on maximization of yields, overall steam and power balance, optimum utilization of water, chemicals and effluent treatment / ZLD technologies through right selection of technology is the key to achieve maximum benefits from existing assets.

Praj's advanced customised technology solutions that insulate the industry from various challenges, are the result of its innovative and customer-centric approach towards sustainable ethanol production.

Challenges in Sugar Industry	Solutions from Praj
<ul style="list-style-type: none"> <li>◆ Sugar surplus in the market</li> <li>◆ Seasonal operation of sugar mills</li> </ul>	<b>BIOSYRUP<sup>®</sup></b> technology is a unique solution to store cane juice syrup, enabling the distillery to operate around the year without depending on external feedstock.
<ul style="list-style-type: none"> <li>◆ Fluctuating scenario</li> </ul>	Multi feed multi product technologies without affecting effluent discharge and offering product flexibility.
<ul style="list-style-type: none"> <li>◆ Stringent environmental norms and statutory compliances related to zero liquid discharge</li> </ul>	Praj's revolutionary <b>PROFIIT<sup>™</sup></b> (Process Optimised Flexible Integrated Incineration Technology) reduces supplementary fuel requirement by up to 60%, leading to lowest operating cost for incineration and reducing plant carbon footprint.
<ul style="list-style-type: none"> <li>◆ Water scarcity</li> </ul>	<b>EcoCool<sup>™</sup></b> technology conserves water by reducing its consumption up to 75% as a better alternative to conventional cooling towers.
<ul style="list-style-type: none"> <li>◆ Effective asset utilization of existing plant</li> </ul>	<b>MAXIMOL<sup>™</sup></b> technology is an innovative bed booster technology to increase production capacity of existing MSDH plants up to 30% without increasing plant footprint.
<ul style="list-style-type: none"> <li>◆ Liquidity crunch</li> <li>◆ Product Liquidity Problems</li> </ul>	<b>BIOSYRUP<sup>®</sup></b> technology helps to achieve up to 50% production capacity enhancement by diverting excess sugar. <b>RenGas<sup>™</sup></b> technology generates additional revenue by converting mill waste press mud to compressed bio gas.
Yield enhancement ♦ Co-product maximization ♦ Faster payback	

## BIOSYRUP® for reliable, round-the-year ethanol production

Praj has more than 15 years of experience in converting various sugar streams like diluted/ mixed juice/ syrup, sugar or B-heavy molasses into ethanol in a sustainable and profitable manner. By harnessing its BIOSYRUP® technology to store diluted sugar streams, Praj has helped the industry solve the problem of round-the-year availability of feedstock. This also helps the industry cope with market pressure despite a volatile and uncertain environment.

Some of the challenges in handling sugarcane juice / syrup as feedstock are -

- Results of conversion vary from factory to factory.
- Since sugar mills operate seasonally in 3-5 month cycles, storage can result in loss of sugar due to bio degradation.
- Possibility of bacterial contamination during fermentation could lead to loss of production yield and efficiency.
- High operating cost for low solid spent wash treatment when using B-heavy molasses.

Praj has set up plants across the globe ranging from 60 KLPD to 600 KLPD using independent sugar streams or in combination with each other. Benefits of Praj's BIOSYRUP® technology include

- 1) Easy storage of concentrated sugar cane juice/syrup for year-round operation.
- 2) Zero bacterial contamination for reliable operation.
- 3) Higher production yields.
- 4) Reduced volume of effluent resulting in lower operating cost, without affecting production yield and efficiency.
- 5) Improvement in overall production yield by 0.5% in sugarcane juice and B-heavy molasses as compared with C-molasses.
- 6) Lower OPEX.
- 7) Zero liquid discharge (ZLD) system.

Round the  
year operation  
with  
BIOSYRUP®

### Power of Seven in Colombia



**Incauca S.A. (300 KLPD)**



**Bio-energy S.A. (480 KLPD)**



**Ingenio Risaralda S.A. (100 KLPD)**



**Ingenio Mayagüez S.A. (250 KLPD)**



**Manuelita S.A. (250 KLPD)**



**Destileria Riopaila S.A. (400 KLPD)**



**Ing. Providencia S.A. (250 KLPD)**



## profiit™ Incineration technology with lowest OPEX

Process Optimized Flexible Integrated Incineration Technology (PROFIIT™) helps distilleries create sustainable processes and makes their business more profitable. This technology is the result of Praj's extensive research in integrating processes with incineration technology, in partnership with Thermax Ltd. Profiit helps customers to not only tackle the problem of waste generated during process but also helps their business achieve sustainable profitable growth.

Spent wash in distilleries are currently incinerated in boilers which impact operational efficiency and profitability. It consumes supporting fuel, involves high OPEX, has low efficiency and generates high ash which cannot be easily disposed. Profiit overcomes these problems, with additional advantages such as-

### 1. Reduction in support fuel for incineration boiler.

Fuel	Conventional incineration boiler technology	Profiit incineration technology	Savings with Profiit incineration technology
Coal	80-85 TPD	24-25 TPD	56-60 TPD
Bagasse	120-140 TPD	40-45 TPD	80-95 TPD
Rice Husk	90-95 TPD	28-30 TPD	62-65 TPD

up to  
**60%**  
reduction in  
supplementary  
fuel

Note: Figures above represent performance of a 100 KLPD plant. They are based on certain assumptions and are subjected to vary based on specific case. GCV considered for concentrated spent wash is 2100 Kg/kcal, for Coal is 3800 Kcal/Kg, for Bagasse is 2200 Kcal/Kg and for Rice Husk is 3200 Kcal/Kg.

- Reduction in overall water consumption for distillery complex to 1-1.2 lit/lit of alcohol.
- High quality ash generation.
- Additional yield of up to 2-3 lit per ton of molasses.
- Reduction in steam consumption by 15-20% making the distillery self-sufficient for steam and power.
- Reduced OPEX due to reduction in CIP chemicals, acid, and cost of chemicals in process condensate treatment plant.
- Reduced CAPEX due to low civil cost in fermentation, evaporation and process condensate treatment plant.

## EcoCool™: Water conservation for distilleries

Save  
water up to  
**75%**  
with  
EcoCool™

Through process integration, this tool can be leveraged in brown field and green field distillery plants, and adapted to any ambient and humid conditions across the world.

### Advantages

- Consumes lesser soft water since there is zero evaporation and drift losses, and therefore does not require makeup water.
- Lower operational expenditure (OPEX).
- No blow down of water ensures recirculation of water quality and water conservation.
- Saving in soft water reduces cost of procurement and treating raw water.
- Reduces OPEX for maintenance of cooling towers and scaling in heat exchanger tubes.
- Reduces cost of treating blow down water.



Evaporative cooling towers are conventionally used in distilleries which result in loss of water.

Praj has successfully installed air cooled heat exchangers (ACHE) at Swaraj India Agro Ltd., to help conserve 6 litres fresh water per litre of alcohol produced.

**EcoCool™** drastically **reduces water consumption up to 75%** as well as cost of pre and post treatment of water.

