



whitefox

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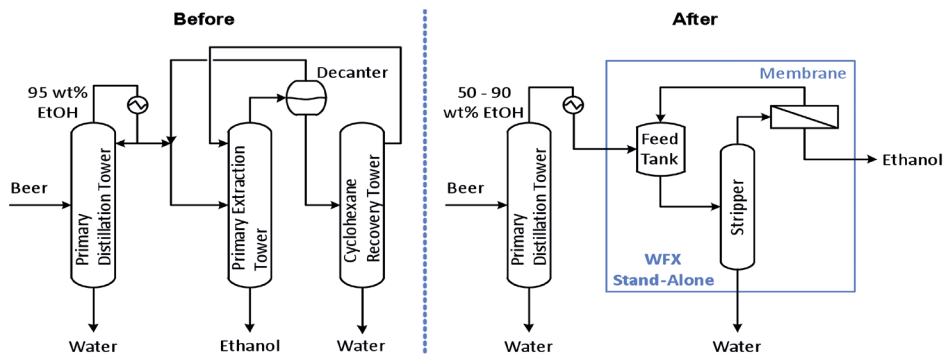
Whitefox Solutions

Challenge

Dehydrating ethanol using azeotropic distillation with cyclohexane is energy intensive. The ethanol concentration in the feed to the cyclohexane tower must be roughly 93 wt%. In addition, the cyclohexane must be recovered and recycled using a separate distillation step. Azeotropic distillation is therefore energy intensive, requiring, approximately five kilograms of steam to dehydrate each litre of ethanol. This problem mainly affects Brazilian producers who sometimes lack sufficient bagasse for operations.

Whitefox™ Solution

The Whitefox solution involves replacing the azeotropic distillation step with a membrane based process. The membrane can tolerate up to 30 wt% water, reducing the load on primary distillation equipment. By implementing Whitefox membrane technology, the steam consumption can be reduced by half. Only 2.5 kilograms of steam are required to produce each litre of ethanol.



Customer Benefits – Case Study

Whitefox recently carried out a feasibility study for a sugar based ethanol facility located in Brazil. Due to the high steam consumption of the azeotropic distillation process, the customer had to buy bagasse to run its boilers. The customer's business model also looked to produce electricity from spare bagasse so it wanted to increase its overall efficiency.

Parameter	Existing solution	Whitefox solution
Capacity	250,000 LPD	250,000 [LPD]
Steam Consumption	4.8 kg/IE	2.5 kg/IE
Bagasse Surplus	-19,503 Tonne/yr	+27,497 Tonne/yr
Electricity Generation	0 MWh/yr	65,450 MWh/yr
Yearly Revenue Increase	-	R\$10 million/yr

Case study assumptions: Price: Electricity: R\$130/MWh; Bagasse R\$80/tonne. Initial set-up: 66 bar boiler, crushing turbine, turbo-gen for onsite electricity generation. Final setup: 66 bar boiler, crushing turbine, condensation turbine expanding to 0.15 bar. Litre of ethanol (IE).

By implementing Whitefox membrane technology, the plant no longer needs to buy bagasse for its boilers and it moves to having a surplus of bagasse that it may use to generate electricity using a condensation turbine. This solution gave the customer the chance to increase its annual revenue by R\$10 million/year (US\$5 million).



For further information please contact

Whitefox Technologies Limited

Europe: +44 (0) 20 7953 8446 North America: +1 403 210 2999

Email: solutions@whitefox.com