

INTEGRATION OF A DHR MODULE WITH A SUGAR/ETHANOL MILL

CENTRO
DE TECNOLOGIA
CANAVIEIRA

Manoel Regis L. V. Leal

NIPE/UNICAMP

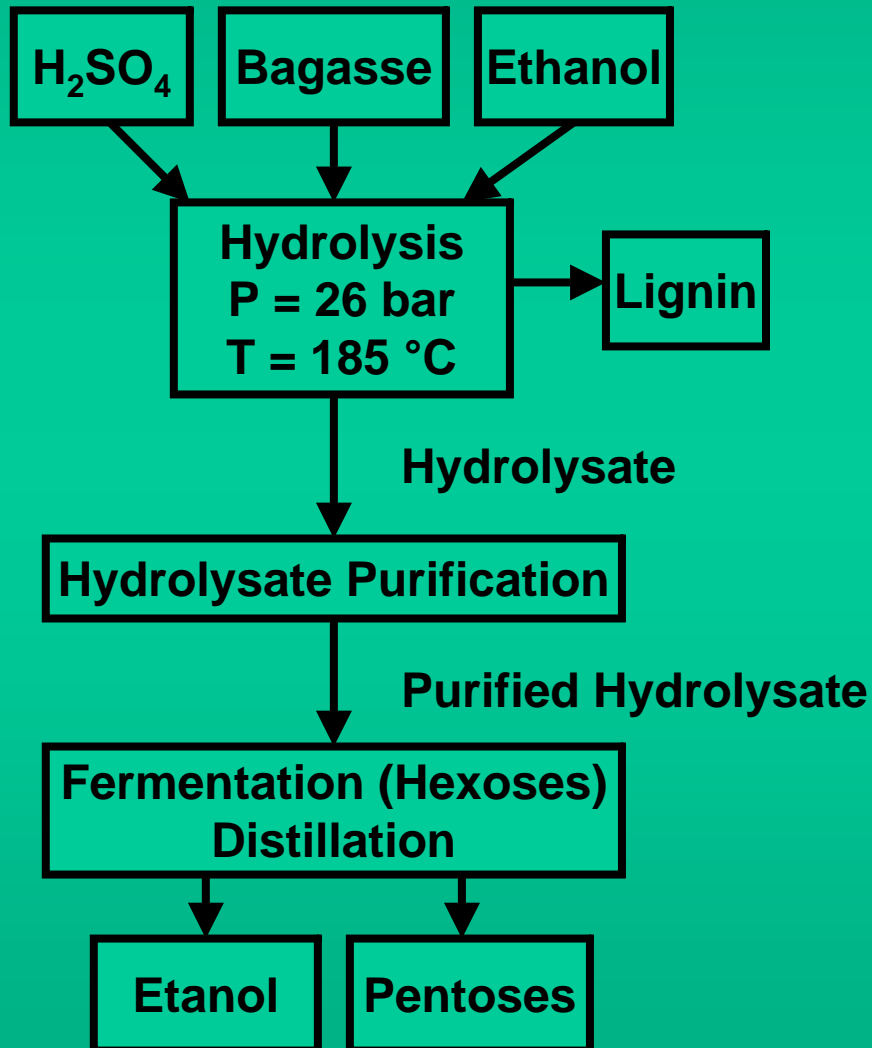
Helcio M. Lamonica

Centro de Tecnologia Canavieira

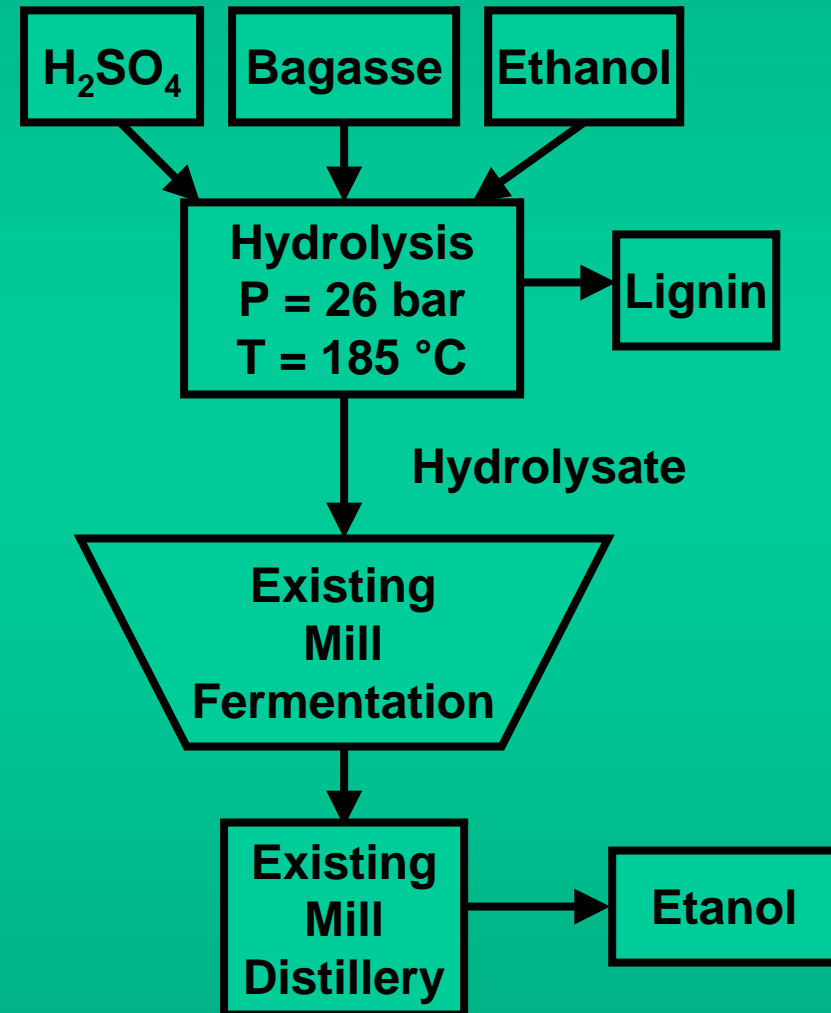


DHR Process

Independent Plant

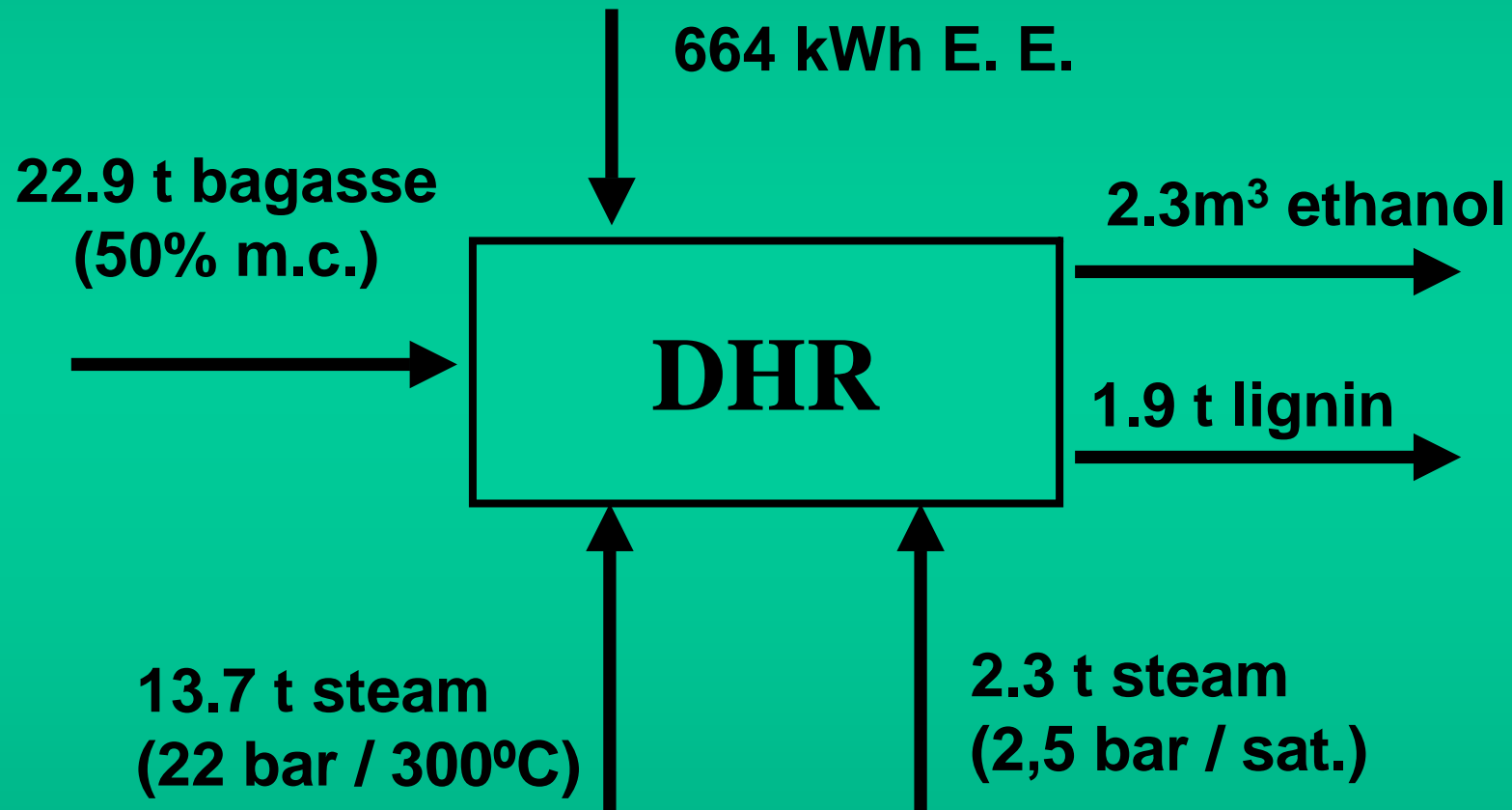


Mill Integrated Plant



DHR – Mass and Energy Balance

100,000 t of bagasse / year



Typical Mill

Total season milling	2,000,000	t cane
Total season period	214	days
Effective milling	182	days
Bagasse % cane	28	%
Production mix	50% ethanol / 50% sugar	
Process steam consumption	500 - 400	kg s/t cane
E.M. energy consumption	30	kWh/tc

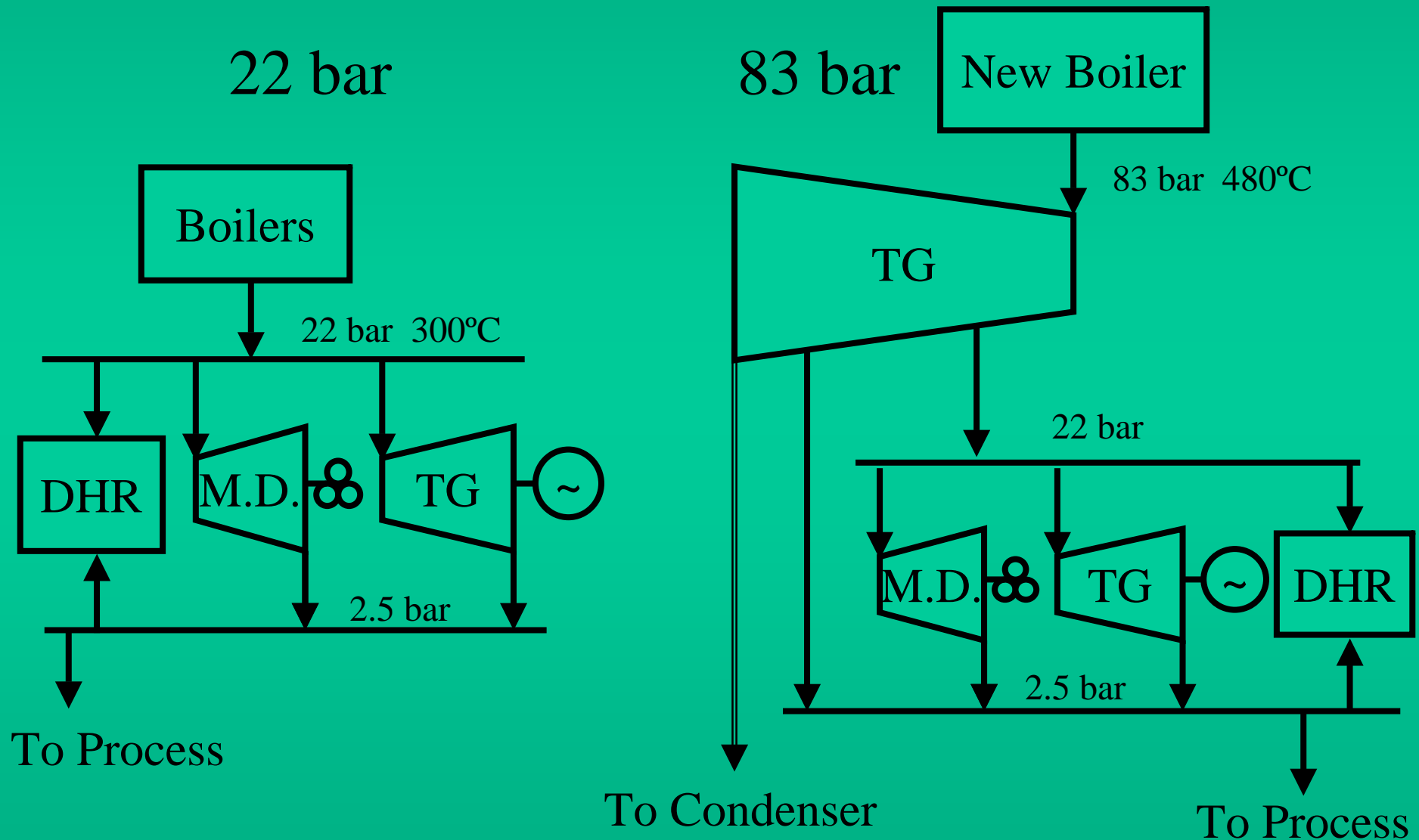
Mill Total Production With Integrated 100,000 t bagasse / year DHR Plant

Milled cane	2,000,000	t / year
Sugar	130,000	t / year
Conventional ethanol	86,000,000	l / year
DHR ethanol	10,000,000	l / year (11.6% more ethanol)

Sugarcane Residues Potential

Bagasse	560,000	t / year (50% m.c.)
Trash	329,000	t / year (15% m.c.)

DHR Integration With Mill



DHR/Mill Integration Alternatives (1)

Alternative	Bagasse surplus (t/year)	Required trash (t/year)	Ethanol produced m³/year	Electricity surplus MWh/year
22 bar/w.o. DHR	122,000	-	86,000	17,900
22 bar/with DHR	-	4,000	96,000	15,900
83 bar/w.o. DHR	102,000	-	86,000	89,000
83 bar/with DHR(2)	-	18,000	96,000	92,000
83 bar/with DHR(3)	-	-	93,800	92,000

Notes:

1- All cases considers 100% cogeneration mode and operation only during the season

2- Use lignin in boilers plus supplement of trash

3- Without lignin and no trash

Thanks