

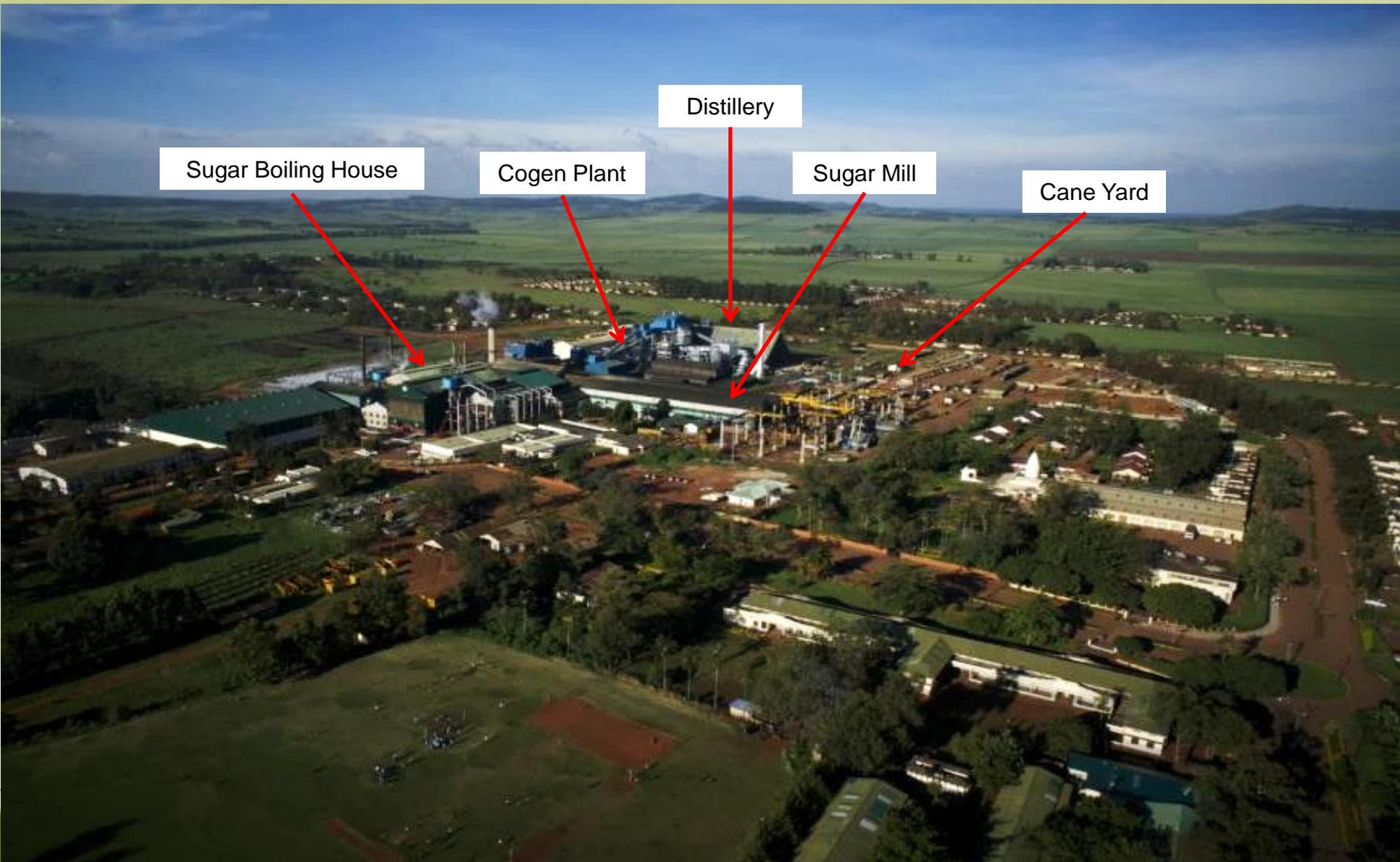


KAKIRA SUGAR LIMITED



BIO-MASS ENERGY ~ INITIATIVES

Kakira overview



Sugar Boiling House

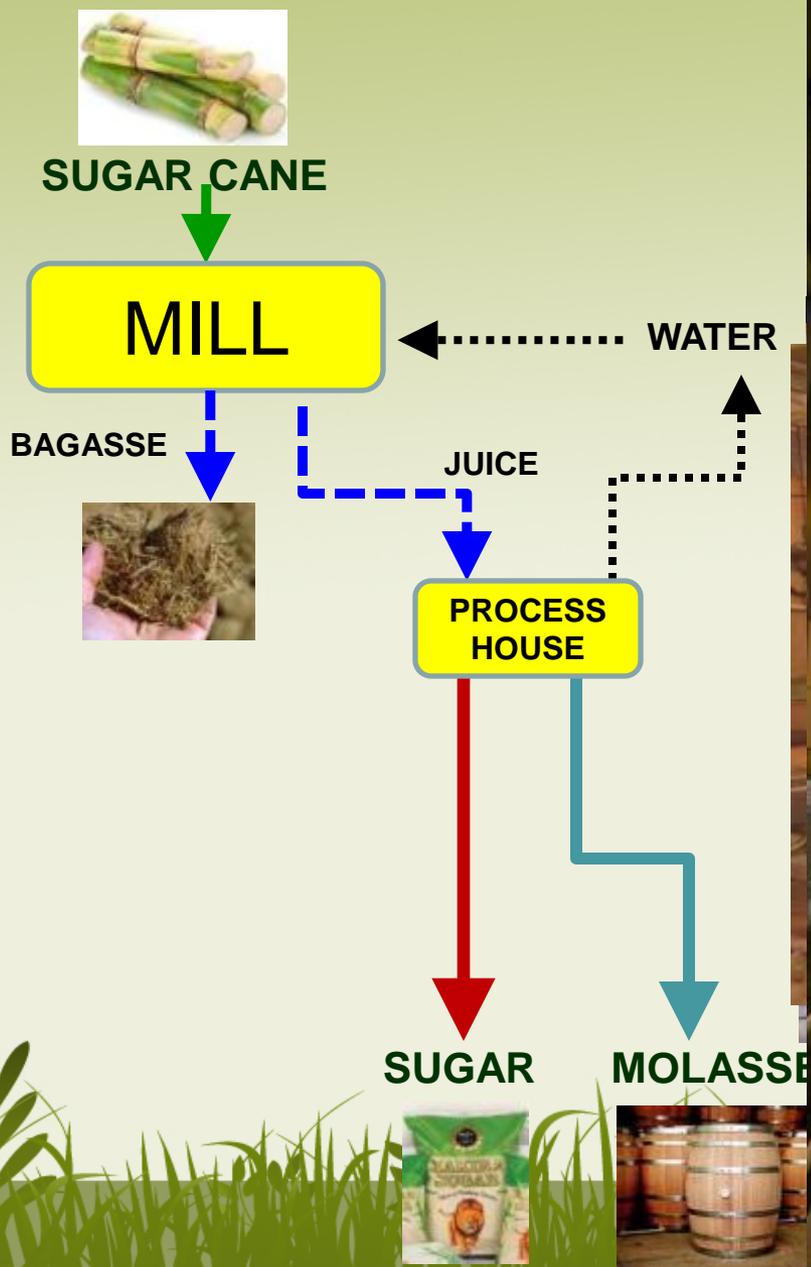
Cogen Plant

Distillery

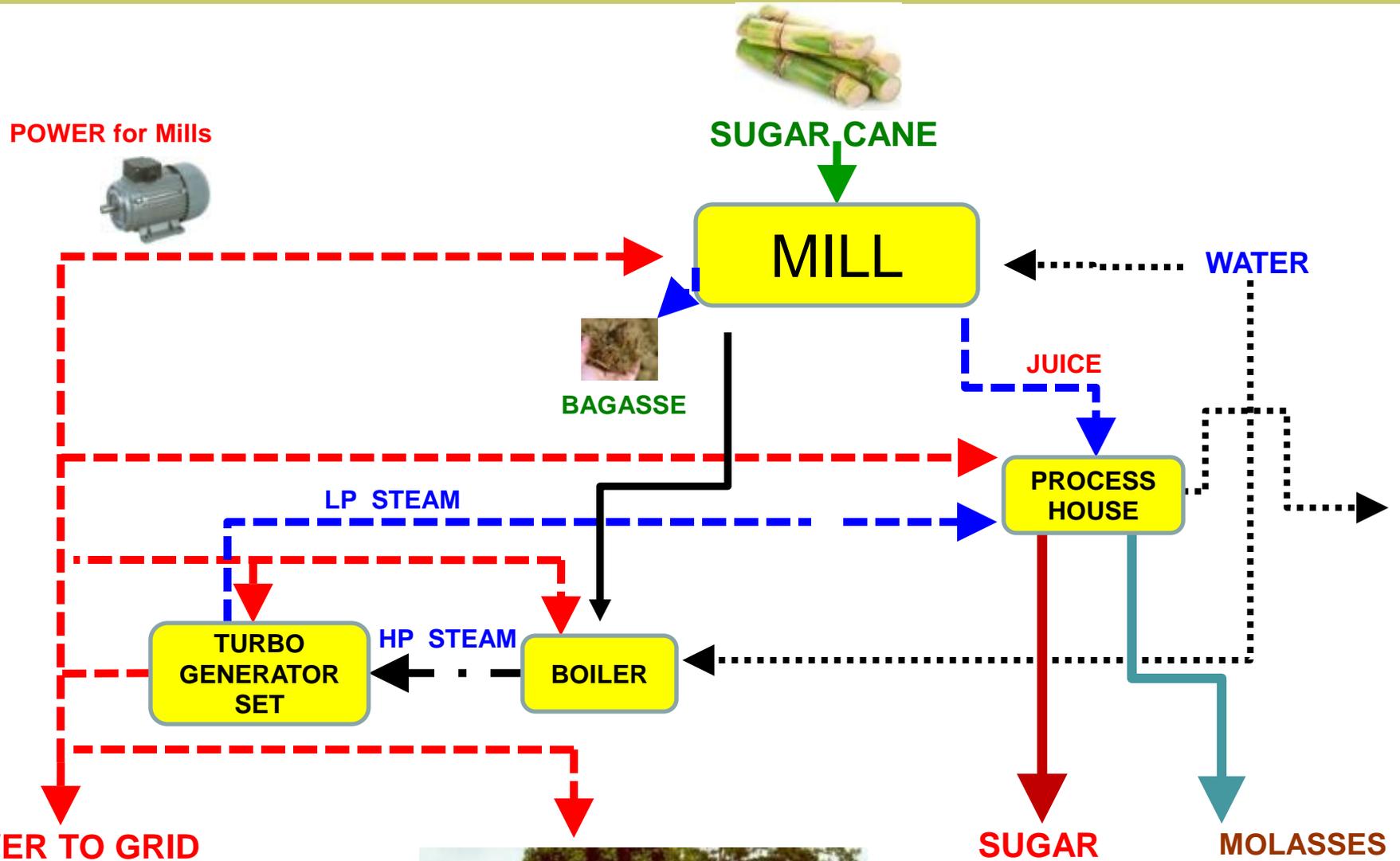
Sugar Mill

Cane Yard

Sugar – from juice to the bag



Cogeneration of Electricity



Cogeneration of Electricity

2007 High Pressure Boilers (2x 50T/h 45 bar 510°C)



Cogeneration of Electricity

2007 High Pressure Boilers (45 bar 510°C)



Cogeneration of Electricity

2013 High Pressure Boiler (160t/h, 67bar, 515°C)



Cogeneration of Electricity

Turbo-alternators [21 MW (2007) + 31 MW (2014)]



Distributed Control System (2014-15)





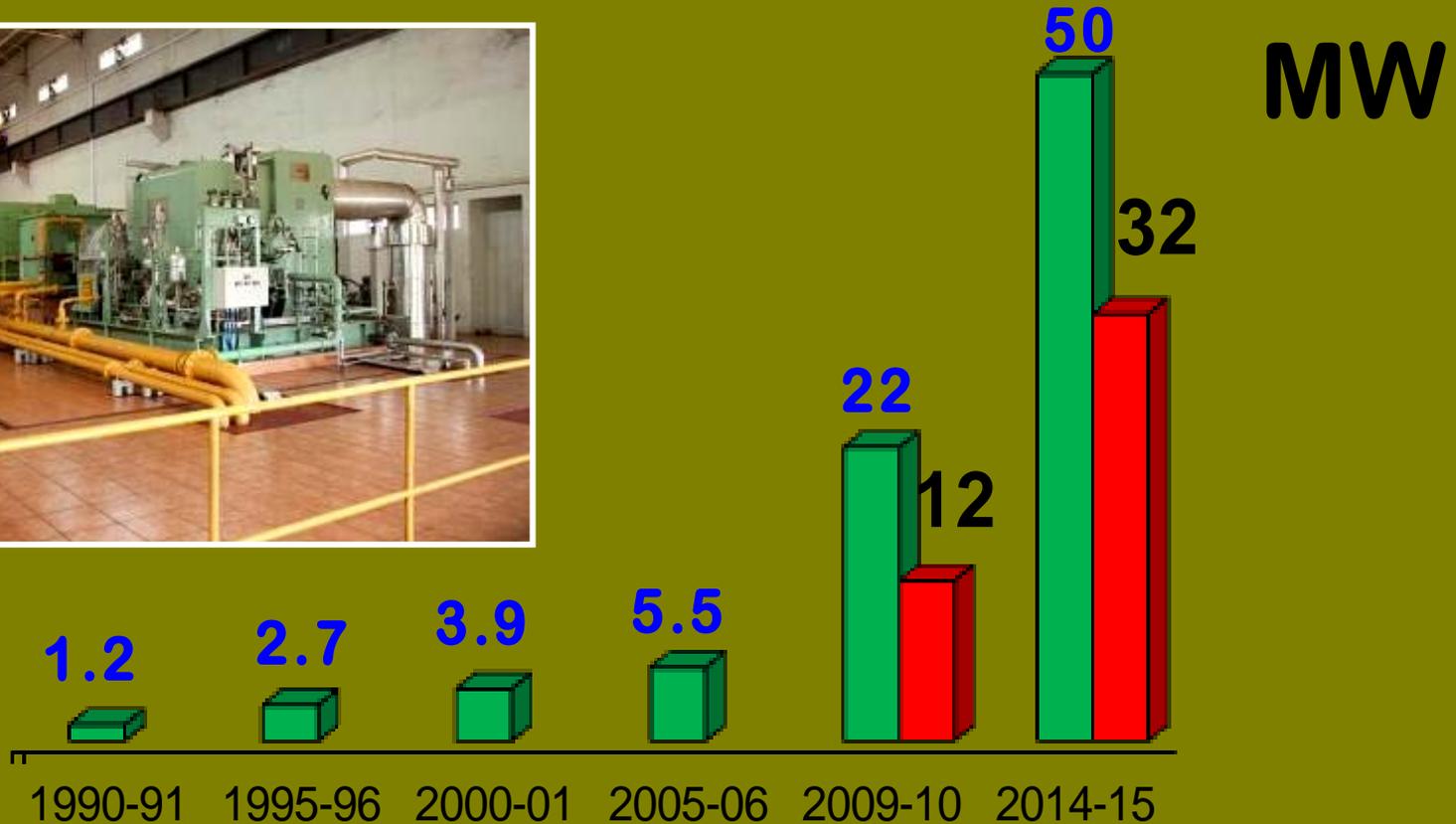
Kakira : Overview

❖ 10.5 month crushing season

KAKIRA			1997	2008	2014-15	2016-17
Factory Capacity	TCD		3,500	6,000	7,200	7,200
Cane supply	Nucleus		60%	40%	35%	35%
	Farmers		40%	60%	65%	65%
	No.		3,700	6,500	9,000	9,000
	Total	TC	650,000	1,500,000	2,000,000	2,000,000
Sugar	TS		62,000	140,000	180,000	180,000
Electricity Generation	In-House	MW	4	10	18	18
	Grid	MW	-	12	32	32
	Total	MW	4	22	50	50
Ethanol	Molasses	TM	24,000	55,000	74,000	74,000
		litres	-	-	-	19,800,000

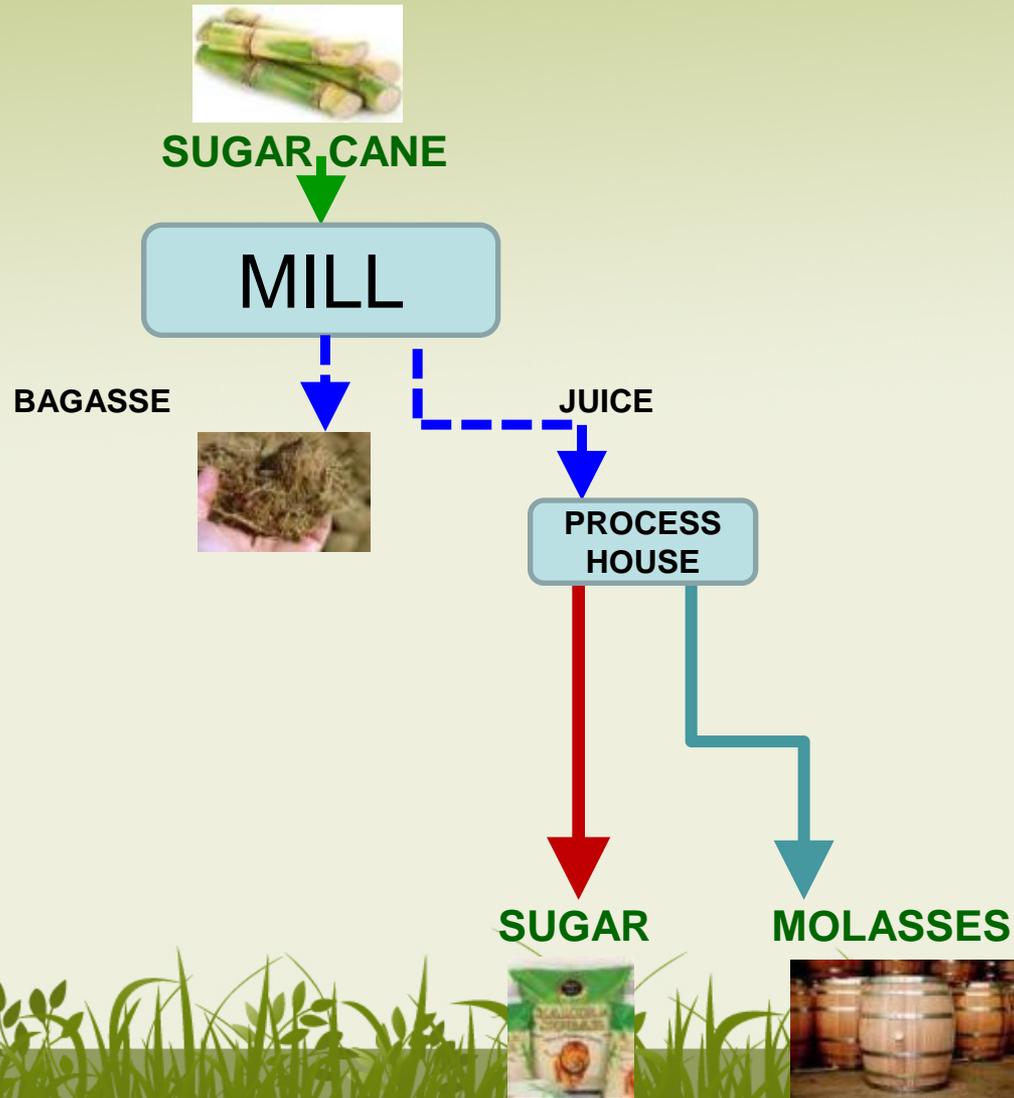
Cogeneration of Electricity

Production of 'green' Electricity

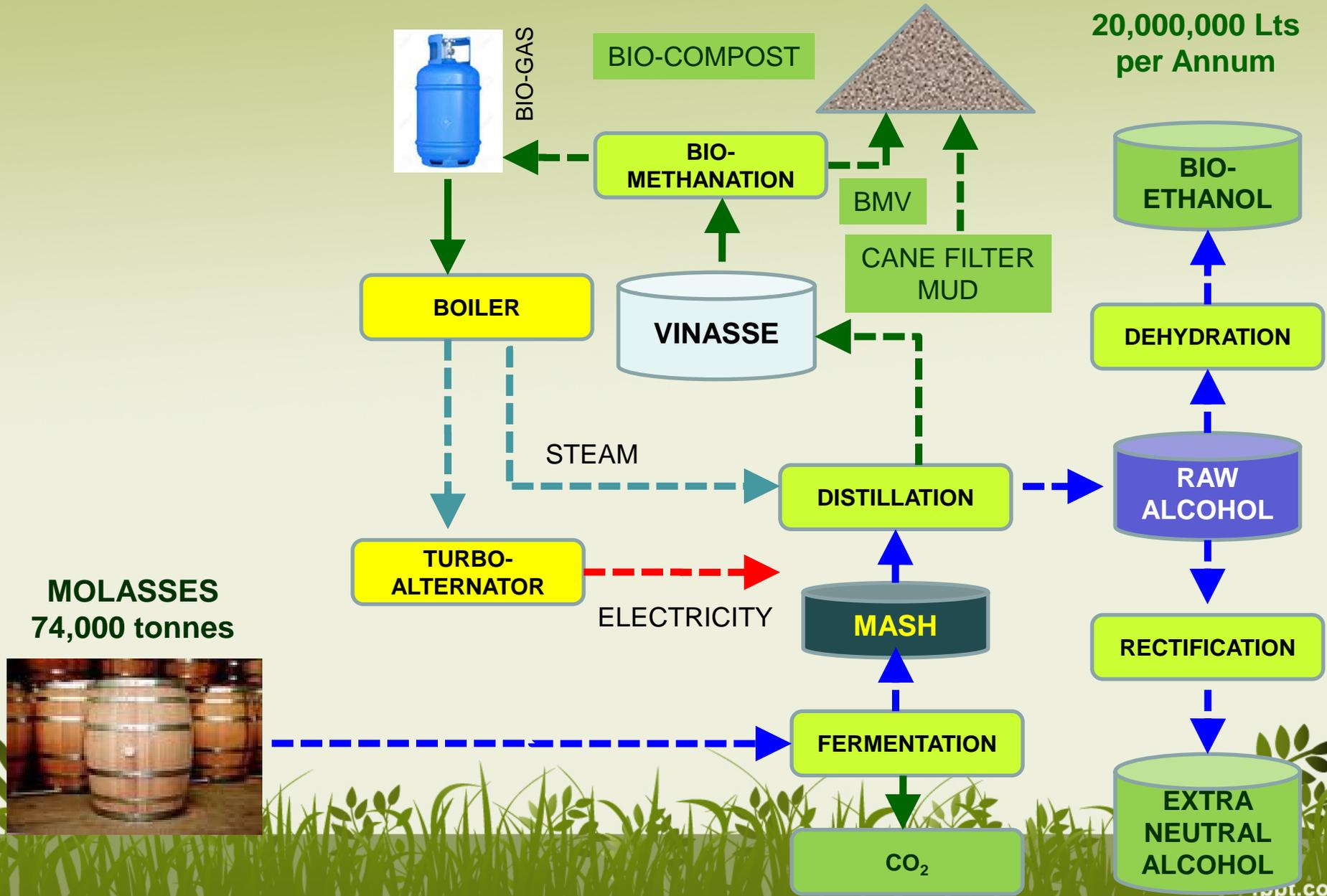


Ethanol

2015/6 expansion, value addition



Ethanol Production Process



Ethanol Site : August-2015



Ethanol Site : 29-Feb-2016

Distillation Section

Alcohol Storage Section

Fermentation Section

Cooling Tower Sub-Section

Kakira Distillery : August-2016

Alcohol Storage Section

Water Treatment

Fermentation Section

08/08/2016 16:05

Kakira Distillery : August-2016



Distillation

Instrumentation
DCS Building

Cooling Tower

08/08/2016 16:12

Kakira Distillery : August-2016



Bio-methanation Section

Cooling Tower

Distillery Power House

Kakira Distillery : Bio-Composting



Bio-Composting Aero-Tiller

Kakira Distillery : Oct-2016



Kakira Distillery : Oct-2016



Kakira Distillery : Oct-2016



Kakira Distillery : Oct-2016



❖ Distillery
DCS
Room



Ethanol Distillery



Product market

★ **Fuel-Grade Anhydrous Alcohol [AA – 99.6%]** for blending with petrol

- ▶ Spark-ignited petrol engines operate well with up to max 15% ethanol (E15) and 85% regular petrol.
- ▶ *Uganda consumes 660 million litres of petrol/year, with growth of 10% p.a.*
- ▶ *For E10, potential demand of 66 mio litres of AA / year*



Ethanol Distillery



Product market :

- ★ Fuel-Grade Anhydrous Alcohol
- ★ For 5% ethanol blending with petrol –
volume of ethanol required = 33 million litres/yr
- ★ This volume of ethanol can be easily provided by :
Kakira (20 mio l/y) + SCOUL Lugazi (12 mio l/y).
- ★ Foreign exchange savings USD 20 million/year (@ \$0.06/litre)
- ★ Government decisions required :
 - ▶ Legislation for mandatory blending
 - ▶ Implementation of tax exemptions set out in 2007 MEMD Renewable Energy Policy – enabling a reasonable price for bio-ethanol
 - ▶ Roll-out strategy –
 - ❖ National blending v/s regional blending v/s selected petro-product distribution companies [PDC]
 - ❖ Allocation of storage tank facilities –national v/s PDC

Ethanol Distillery



Product market

★ **Extra-Neutral Alcohol [ENA]** for potable spirits

Uganda Market : Present local consumption demand
3 million Litres / month = 36 million Litres / year
Local demand growth rate 14% per year.

Only one producer SCOUL – Lugazi
Plant capacity = 35,000 Litres /day
⇒ 11 million Litres/year

ENA imports ⇒ 24-26 million Litres / year



In addition - there is a significant demand in
neighbouring countries : Kenya, S Sudan, DR Congo.

Ethanol Distillery



Product market

★ Ethanol Fuel for clean Cook Stoves

Uganda Market : The main source of energy used by Ugandans for cooking is currently charcoal and fuel-wood.

Uganda deforestation:

- 1990 – 2000 = 1.76% (86,500 Ha p.a)
- 2000 – 2005 = **2.13%**

Immense potential to introduce ethanol cook stoves.



Ethanol Distillery

Product market

★ Ethanol Fuel for clean Cook Stoves

- ✓ Family friendly
- ✓ Comfortable indoor use
- ✓ Simple storage requirements
- ✓ Not Pressurised – no explosion risk



Ethanol Distillery



Product market

★ Ethanol Fuel for clean Cook Stoves

Government approvals required :

- ❖ Approval of a denatured ethanol cooking-fuel standard
- ❖ Explicit exemption of "denatured industrial ethanol for cooking fuel purposes" from general Ethanol excise tax
- ❖ Reduction of import tariffs on clean cook-stoves (this concession covers many stoves, including Ethanol stoves) from 25% to nil (0%) or only 10%
- ❖ Removal of 18% VAT on clean cook-stoves

Saraya Manufacturing (U) Ltd

Ethanol-based Hand Sanitisers



Kakira Overview 2016

Ethanol
Distillery
20,000,000
Litres

BioGas
Plant
9,900,000
m³

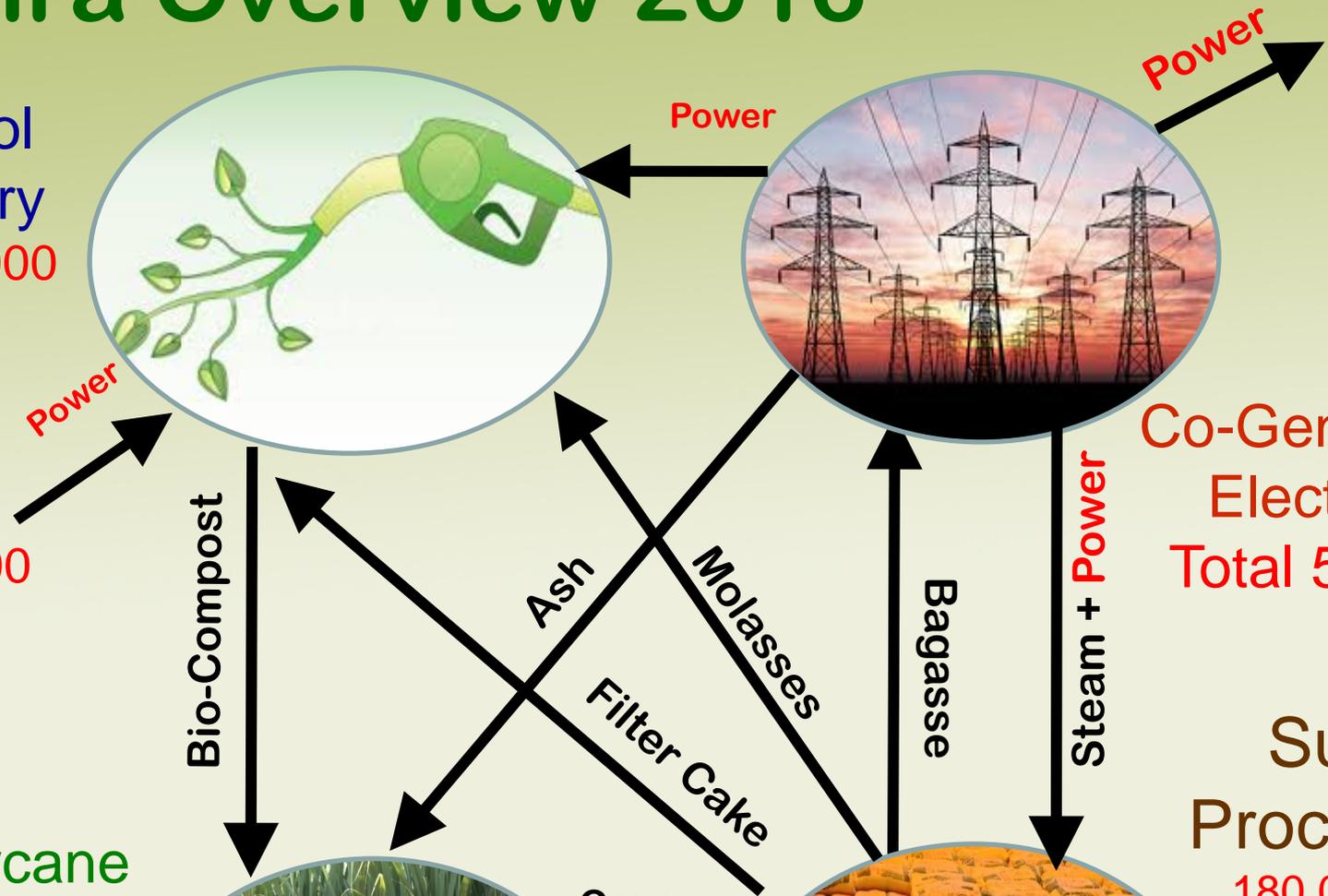
Sugarcane
Plantation
14,000 Ha
+
21,000 Ha



Uganda
Grid
30 MW

Co-Generation
Electricity
Total 50 MW

Sugar
Processing
180,000 TS
+
74,000 TM





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