



energy

Department:
Energy
REPUBLIC OF SOUTH AFRICA



Tongaat Hulett

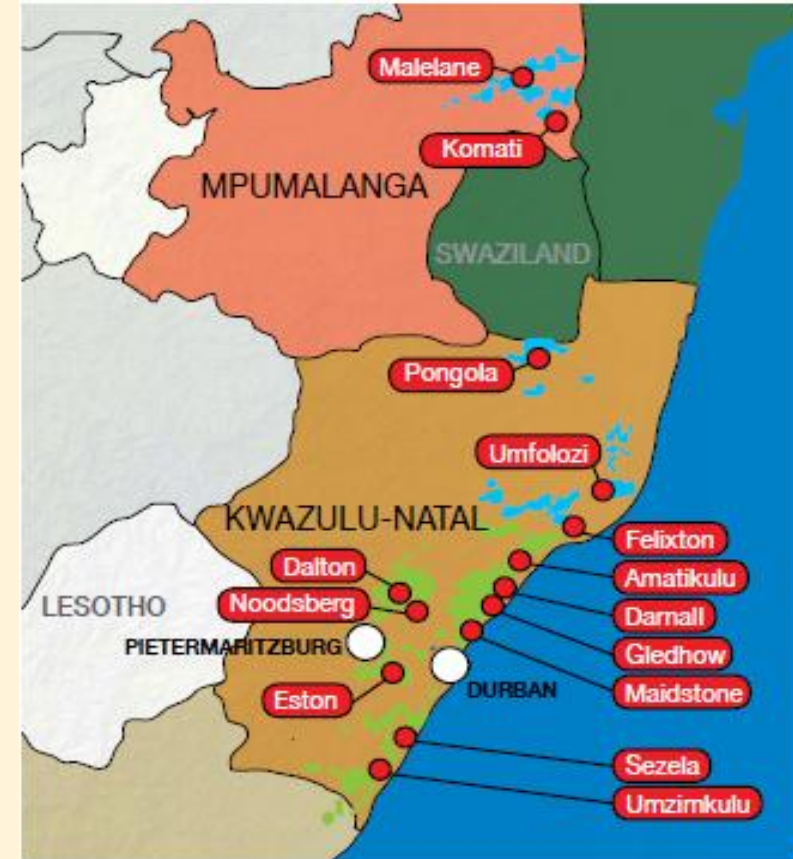
**SUGARCANE POTENTIAL
Food & Energy**

30 October 2013



SA Sugar Industry economic contribution

- **SA sugarcane industry is**
 - Diverse – agriculture, sugars (raw, refined, specialised), syrups and range of by-products
 - Internationally cost competitive, high quality producer
- **Important contribution**
 - Employment (particularly in rural areas)
 - Sustainable investment – agriculture and industrial
 - Foreign exchange earnings
 - Significant support industries & customers
- About 29 130 registered sugarcane growers (KZN, MPU, EC)
- Six milling companies with 14 sugar mills
- About 2.2 million tons of sugar per season
- About 60% sold in SACU; export to Africa, Asia & Middle East
- Annual estimated average direct income of R8 billion
 - R 2.5 billion from export
 - R 5.1 billion in sugarcane production (~17% of total gross value of annual field crop)
- **Employment**
 - Direct: ~79 000 jobs (significant portion of SA agric)
 - Indirect: Estimated ~350 000
 - Livelihood to ~1 million people (>2% of SA population)



Potential in Sugarcane Processing

Tops and leaves
not currently utilized,
is about equal to
sugarcane fibre

Fibre

Electricity & Steam

- Currently fuel supply to match own energy use
- At high efficiency 2 to 7 times more electricity

Other Products:

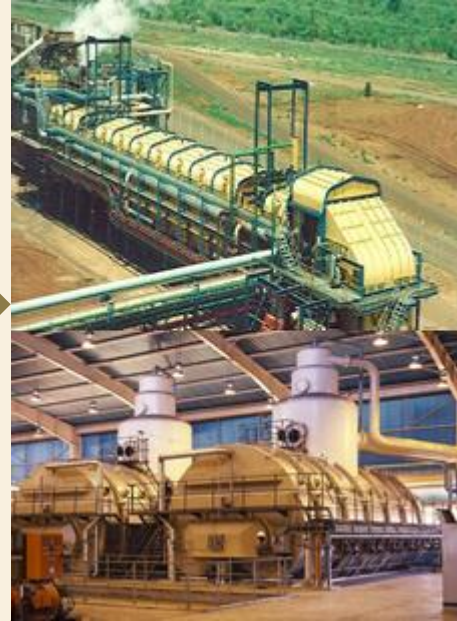
Animal feed, Paper, Chemicals

Future – cellulosic ethanol

Sugarcane

15% Fibre

15% Sugar



Global trends

- Diversify product offering
- Improves revenue & cost effectiveness
- Brazil leading in ethanol
- India leading in electricity

Sugar to market

Molasses

Sugars to fuel ethanol

Water free
(blend to E10)

Water containing
(Fuel Flex Vehicles)



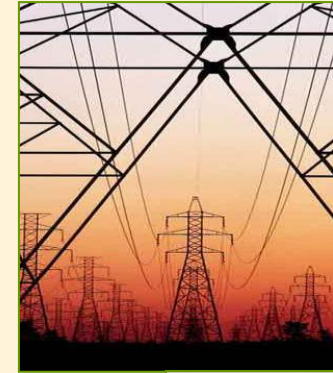
Sugarcane – one of most efficient plants to convert sunlight to energy

Season – ethanol could extend existing 36 weeks to 40 weeks

International Industry Trends

International - Permanent Structural Change

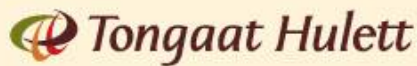
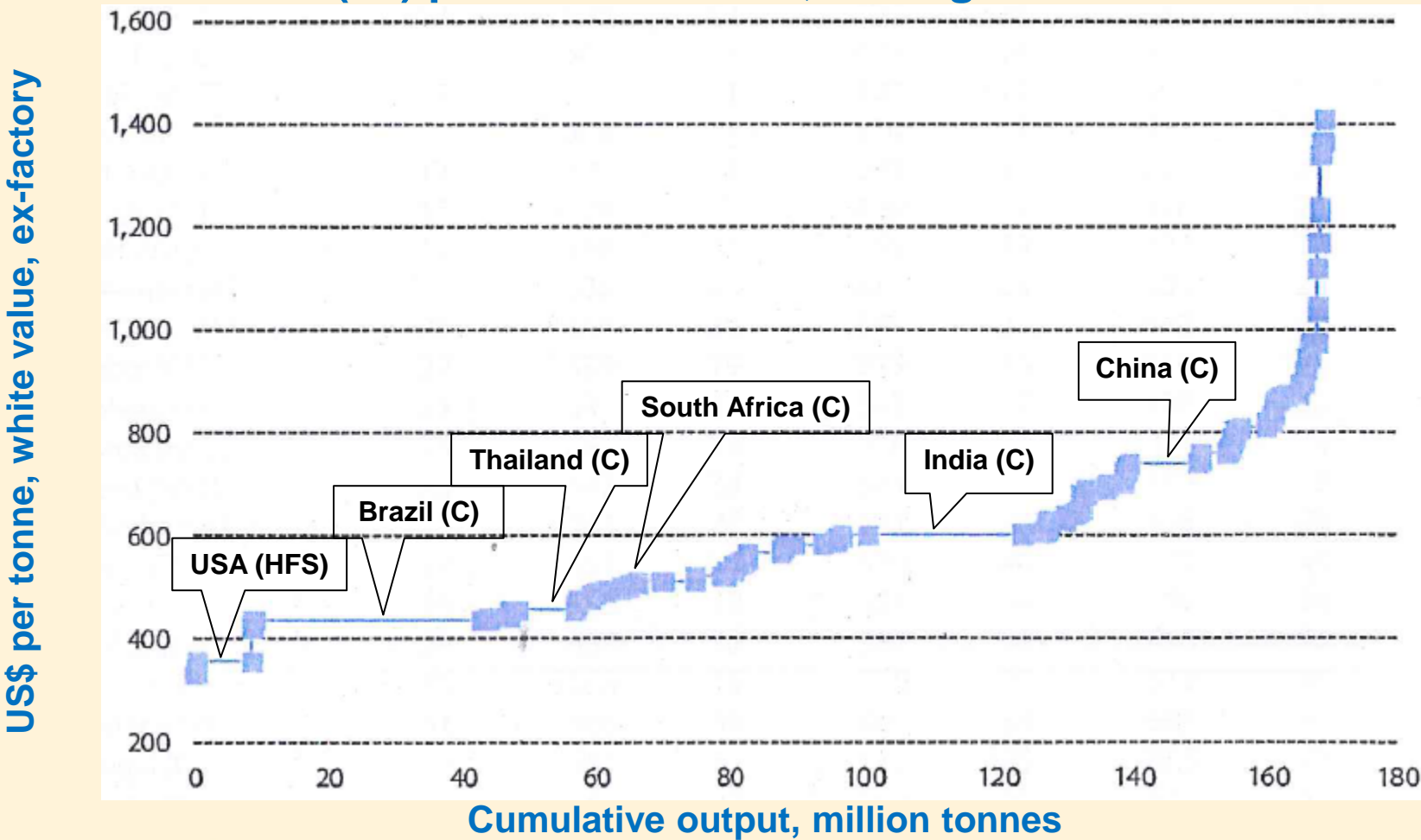
- World's two largest cane producers, Brazil and India, have access to sugar, electricity and ethanol markets
- Brazil ethanol dominant (~60% of sugars to ethanol)
 - ~55% Bioethanol volume penetration in petrol pool
 - 60% growth in electricity from sugarcane over last 10 years
 - Bagasse-fuelled turbines supply ~7% of total power
 - Sugarcane industry estimates potential at 15,300 MW by 2020
- India electricity dominant
 - started in 1995
 - 2012 capacity 5 000 MW
 - 2015 target 10 500 MW
- Thailand, Mauritius, Australia, etc. transforming to co-produce sugar, ethanol and electricity



Sugar-only industries are revenue uncompetitive

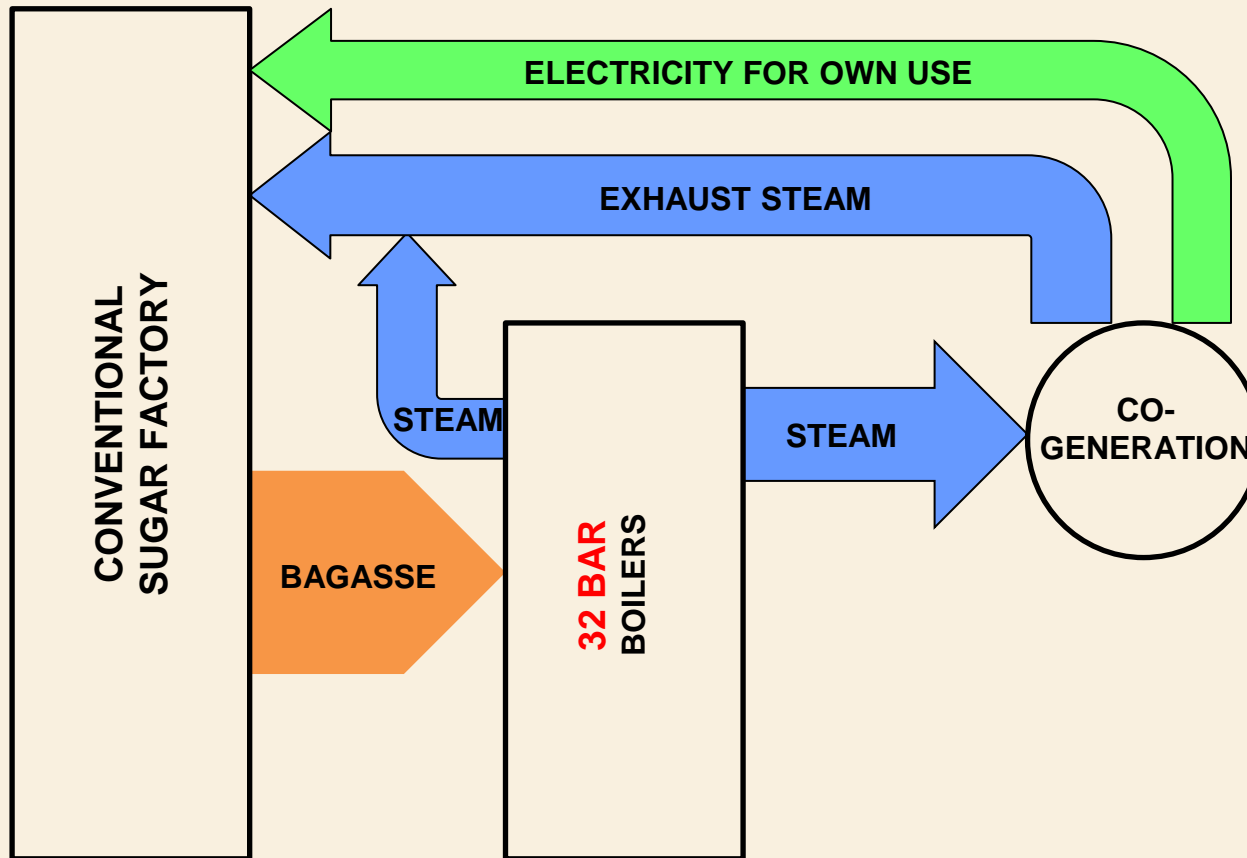
South African Sugarcane Internationally Competitive

Weighted world average of nominal cane sugar (C), beet sugar and HFS(55) production costs, average 2009/10 – 2011/12



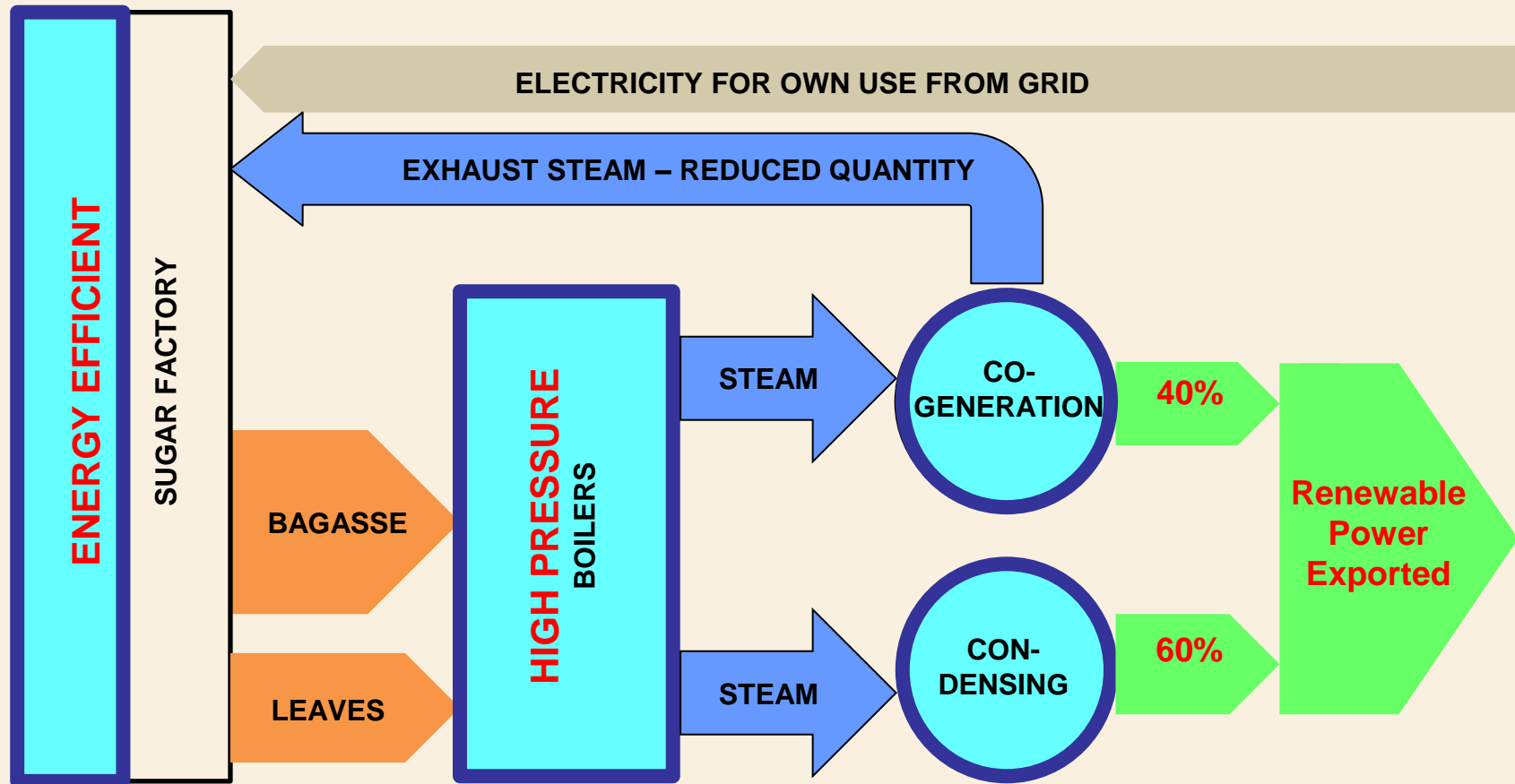
Source: LMC INTERNATIONAL 2013

Typical Conventional SA Sugar Mill



NOTE: Full Cogeneration (Combined Heat & Power) implemented as the standard

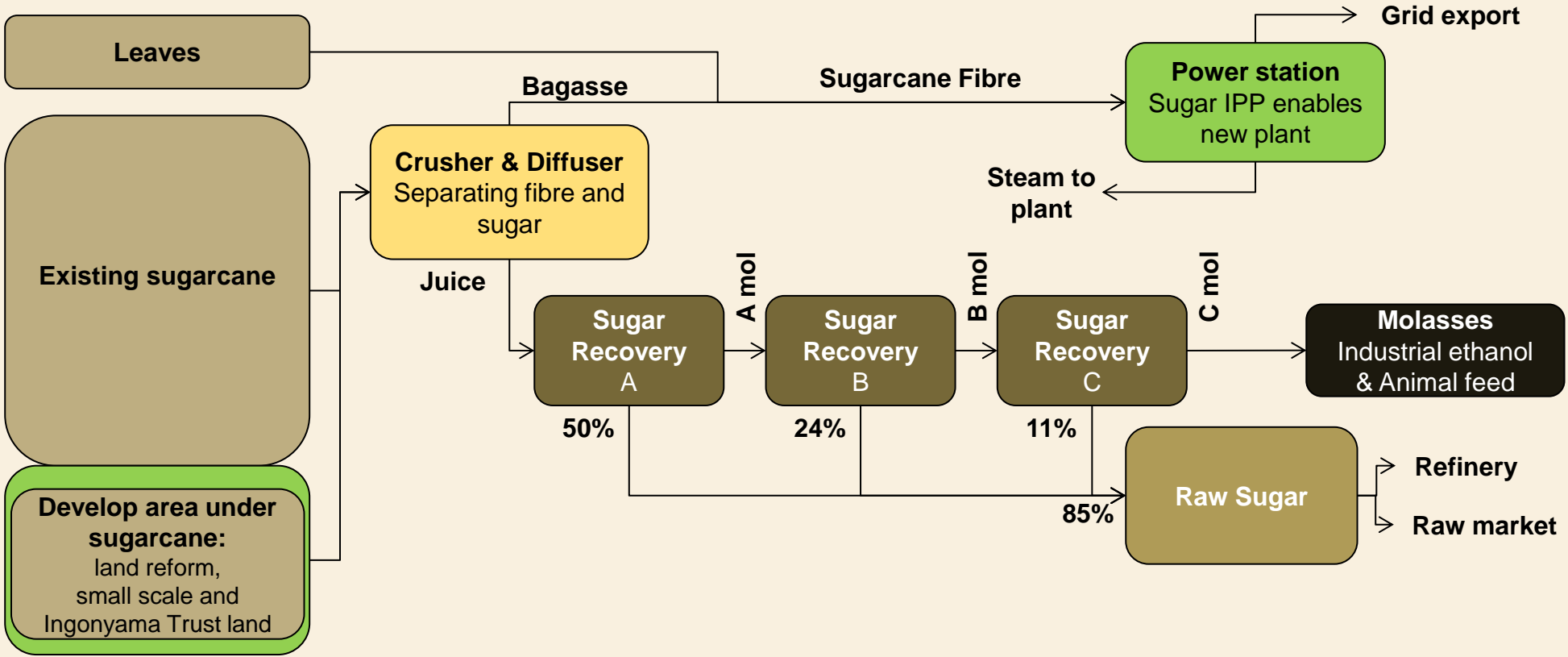
Sugar Mill with Power Station



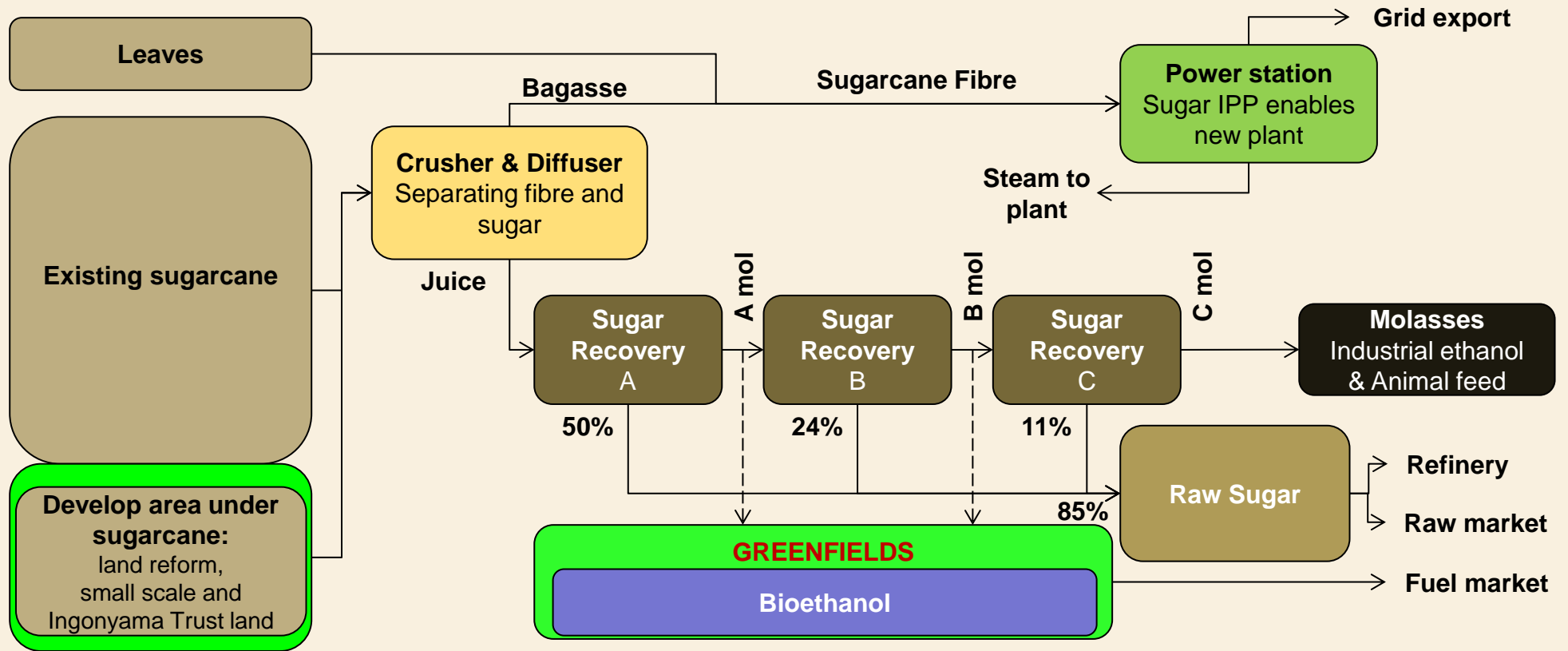
Project comprises:

- Energy efficiency modifications to Sugar Factory
- New High-Pressure Boilers + Co-generation & Condensing Turbo-alternators
- Use of sugarcane leaves to supplement bagasse fuel

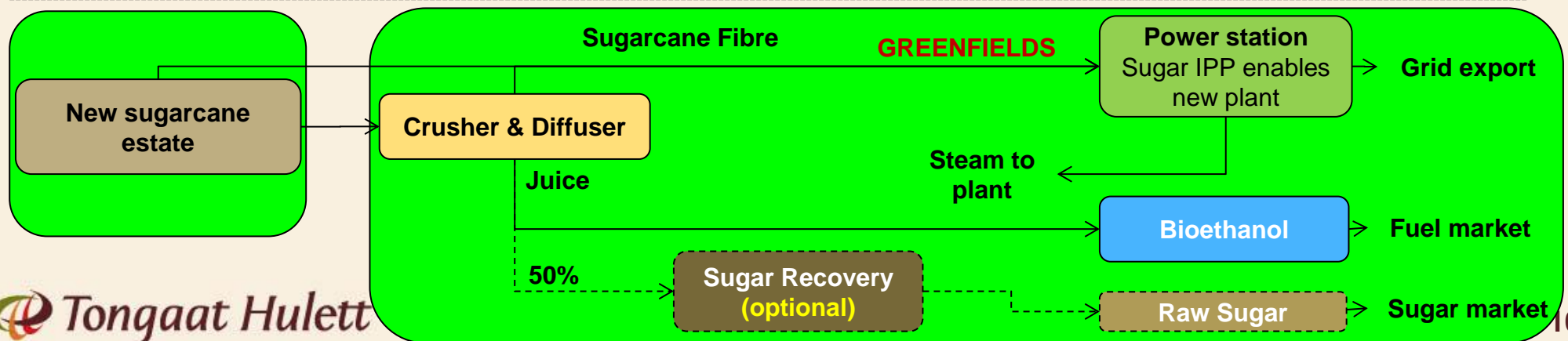
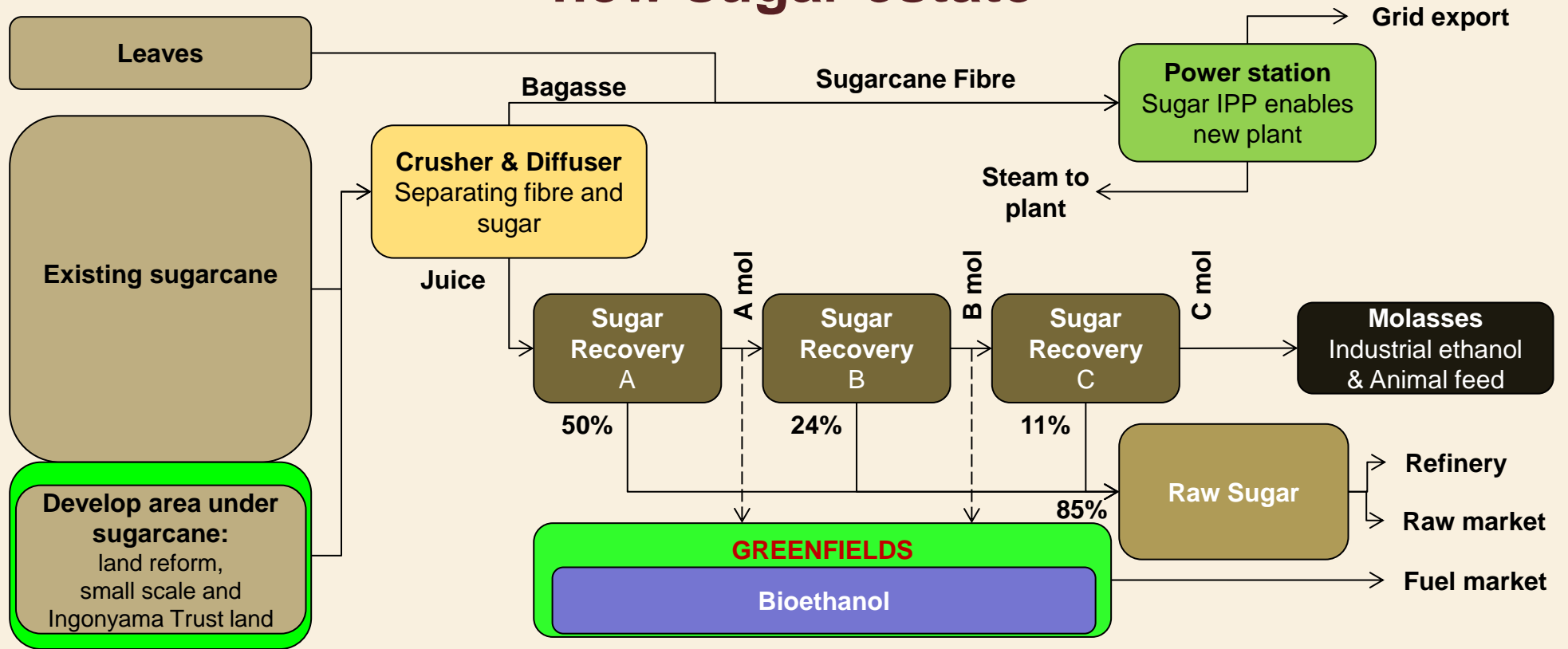
Conventional sugar production with renewable electricity



Sugar production - add Greenfields bioethanol plant



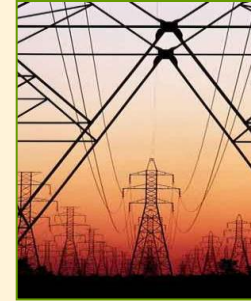
Sugar production with Greenfields bioethanol plant and new sugar estate



SA – Renewable Energy from Sugarcane

- **Electricity – 1 000 MW**

- 14 existing mills at full capacity
- 1 (maybe 2) new ethanol estates and plants
- Generation during season– “base load during peak demand”
- Expected investment more than R20 billion by 2022
- ❖ CO₂ reduction - >4 million ton CO₂ per annum



- **Ethanol – 600 to 1 100 million liter**

- Full sugarcane supply ~ 25 million ton
- Extend season by 4 weeks - increase sugarcane supply to ~28 million ton
- 5 to 6 bioethanol plants linked to existing 14 sugar mills
- Export Raw Sugar to Ethanol 600 - 800 million liter
- New estates and Ethanol Mills 300 million liter
- Expected investment more than R10 billion
- ❖ CO₂ reduction - >1.3 million ton CO₂ per annum



- **Sugarcane main cost drivers**

- Energy (Oil & Electricity) pricing
- Food and Agriculture Pricing Trends
- Currency

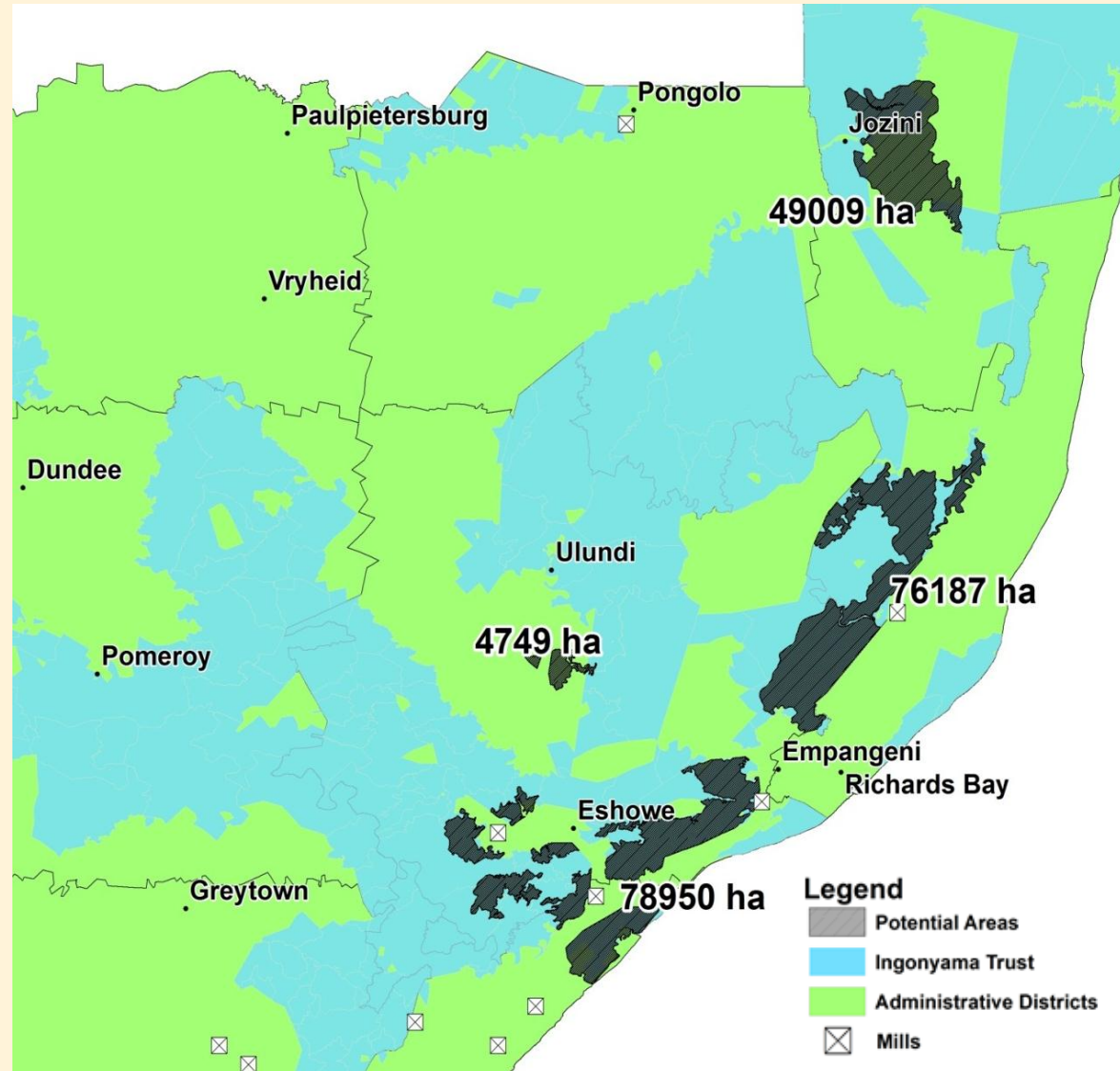


Significant Job Creation Potential

	Sugarcane Industry [#]		
	Electricity	Ethanol Existing Sugar Mills	Ethanol New estate and Ethanol mill
Potential projects	14 cogeneration	5 bioethanol plants	2 bioethanol mills
Capacity [million litres]	800 – 1,000 MW	725 million litres	250 million litres
Construction Jobs	12,972	3,300	4,800
Operations Jobs	433	250	800
Agriculture			
Increase area under cane	>44,000	67,000	31,000*
Jobs per phase	20,700	12,500	12,800
Total Agric. Jobs	20,700	25,300 (based on current practice)	

Potential sugarcane area >200,000 ha

Genuine job creation opportunities



SA Renewable Energy getting traction

Electricity – most recent significant milestones

- Ministerial Determination & NERSA concurrence (MTRM cogeneration) – Dec '12
- Request For Registration & Information – July 2013
- Expect Request for Proposal (RFP) before end of Q1 2014

Ethanol

- Main challenges to bridge
 - Blending – fuel specification and logistics
 - Incentive scheme – feedstock specific; cater for risk from commodity cycle
- “Mandatory Blending Regulations” in Government Gazette (24 August '12)
- Implementation date 1 October 2015 in Government Gazette (30 September '13)
- Minister of Finance Budget Vote speech (Feb '13) announced a fuel levy of ~4 c/l
- Biofuels Implementation Committee (chaired by DoE) functional
- Minister of Energy Target Implementation of Policy 2013
- Clarity required on challenges – commercial foundation required

Provisional IEP comments

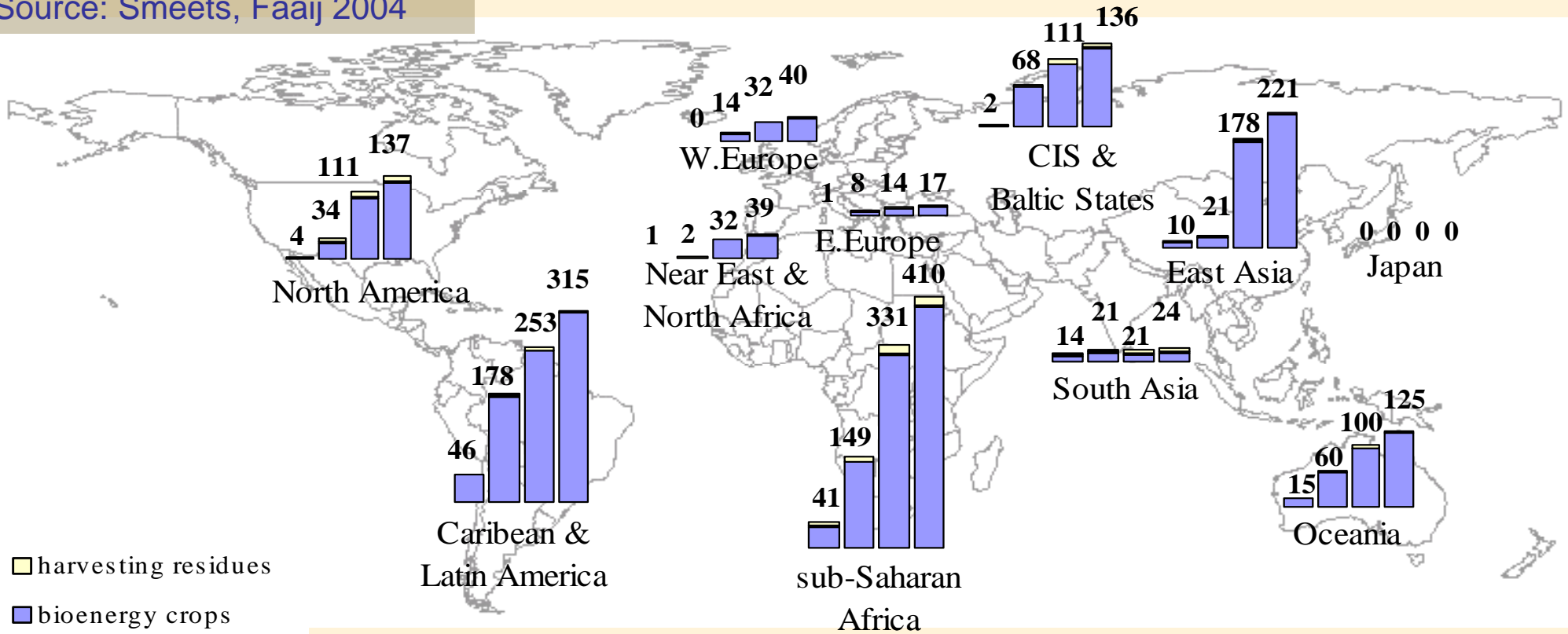
- **Tongaat Hulett willing to support with supply of modelling data**
- **Reference to bagasse as “waste fibre from sugarcane” is factually incorrect**
 - **Supply heat & power to sugar mills**
 - **Used in paper and animal feeds manufacturing (limited volumes)**
- **DoE biofuels feasibility study seems incorrect (confirmed through BIC engagement)**
 - **Different result from own assessment by Tongaat Hulett**
 - **Tongaat Hulett is also the biggest wet maize miller in Africa**
 - **Considering commodity cycles over adequate period - sugarcane bioethanol compares very favourable with sorghum derived**
 - **Hence incentive should be substrate specific to handle commodity risk**
- **Bioenergy potential from sugarcane seems unaccounted for on supply side**
- **Economic benefit from sugarcane bioenergy can easily justify price premium**

Sugarcane has huge SADC Bio-energy potential

- **Scenario: SADC E50 regime with fuel flex vehicles over next 20 years**
- **Rural development**
 - 2.5 – 3.5 million hectares of crop land under sugarcane (3% - 6% of available)
- **Job creation**
 - Over 10 - 15 years can create 3 million direct jobs (1.8 million permanent)
- **Positive impact on SADC trade balance with renewable energy**
 - R 200 billion – annually earned by SADC “rural economy”
 - R 39 billion – trade balance in favour of SA with SADC (R 30 billion imported in 2011)
 - 30 billion litres of ethanol (20 billion litres of petrol equivalent)
 - 8 000 to 10 000 MW electricity
 - SA is 70% of the fuel market and 80% of the electricity market
- **Industrial development**
 - Build 100 to 120 new sugarcane mills for ethanol and electricity
 - R 20 to 30 billion annual manufacturing and service in SA to support build program
- **Reduce CO₂ emissions**
 - Climate Change Mitigation (15% - 35% of SA commitment)
- **Improves food & energy security**
 - Equivalent to 13 SA sugar industries

Bio-energy potential 2050 - scenarios

Source: Smeets, Faaij 2004



Northern SADC combined

- Production opportunity with land and water
- Scale for cost effective ethanol & electricity
- Potential to build on Brazilian example

Regional opportunity to a better future for all

- **Market access**
 - SA market big enough to allow for capital efficient factories throughout SADC
 - Both fuel ethanol and renewable electricity
 - SA Energy policy to go beyond hydro-power & natural gas import from SADC
 - Policy & Regulations not supportive of SADC bioenergy regime
 - Other SADC markets currently too small – capital inefficient factories
- **Infrastructure required**
 - Roads, bulk water supply, bulk electricity supply cannot be funded by individual projects
- **Policy & Regulation**
 - SA getting closer to creating the environment for investment in SA
 - Other SADC countries does not have a sound base for investment
 - Align SADC frameworks (Automotive, Energy, Climate, Agric, Water, Infrastructure, Funding)
- **Benefit Sharing**

South Africa		Rest of SADC	
Give	Gain	Give	Gain
<ul style="list-style-type: none"> • Low risk market • Scale 	<ul style="list-style-type: none"> • Localisation of investments • Service jobs • Strong neighbouring economies • Spend energy account in region • Improve trade opportunities • CO₂ emission mitigation 	<ul style="list-style-type: none"> • Land • Water • People 	<ul style="list-style-type: none"> • Rural development • Economic development • Jobs • Low risk market • Improve trade balance with SA

Summary

World leading sugarcane industry

- Full value – Sugar, Electricity and Ethanol
- Cost & Revenue competitive integrated sugarcane value chain
- Improved resilience - commodity cycles, weather and adaptation

Rural Development in KwaZulu-Natal and Mpumalanga

- Extensive expansion of sugarcane in previously underdeveloped areas
- Extensive Investment in Rural Economy - R23 billion to R40 billion
- Enables sustainable Land Reform

Excellent Fit with Government Policy Imperatives

- Rural development (especially communal areas)
- Creates about 40 000 to 50 000 long-term jobs
- Creates about 20 000 construction jobs
- Contributes to SA carbon emission reduction commitments

Eager to support updating of IEP

- Sugarcane bioenergy potential
- Modelling data to be supplied

Sugarcane - do more with the same!