

SASTA 2010: Diversification Session

PW Rein: Challenges facing diversification in sugarcane processing

- Recent world sugar trade patterns emphasise the need to diversify to be sustainable
- Diversification options
 - Ethanol
 - Electricity for export
 - Energy from lignocellulosics
 - Biomass to liquid (BTL)
 - Sugarcane is the only “energy” crop commercially proven on a large scale
- Challenges faced
 - Need to become biomass processing plants
 - Biorefineries can utilise synergies
 - Government and regulation authorities have a great influence
 - Need to push the boundaries
 - Energy efficiencies need to be improved
 - Harvesting issues – green cane harvesting?
 - Look at other biomass crops – eg sweet sorghum,
 - Look at GM or “designer” cane
- Strategies for change
 - How do you change an industry that has done the same things for over 100 years
 - Progress research from bench-scale to commercial reality
 - Are subsidies necessary? Do these come from industry or government?
- Collaboration has advantages
 - Allows for a broader field to be researched
 - Spreads costs and risk
 - Each partner must have something of value to contribute
 - Objective must be to create new value, not just exchange information
- **JUST DO IT**
- Some thoughts
 - Substantial change requires industry and government commitment
 - The first steps, ethanol and electricity, are technologically risk free
 - Diversification will lead to improved sustainability
 - Sugar operations will increasingly look at GHG emissions in designing new products
 - Exploit the small carbon footprint of cane sugar
 - Other biomass crops complement sugarcane processing in many cases
 - A sugar mill is the ideal starting point for the stage-wise implementation of value adding activities
 - Be prepared to change – it’s a mindset thing. “The only constant is change”
 - SASTA is a spur to innovation

V Kochergin: Sugar Industry Diversification: Pathways to non-ethanol fuels and chemicals

- Need for diversification
 - Continue sugar production
 - Integration of emerging technologies into existing allows for significant cost reduction by utilisation of capital assets
- Paradigm shift from sugar processing to cane processing
- Look at \$ per hectare and ensure this is attractive and sustainable
- Biofuel options
 - 1st generation
 - Bioethanol
 - Biodiesel
 - 2nd generation
 - Cellulosic ethanol
 - Butanol
 - Thermochemically derived fuels – methanol, ethanol, hydrogen, Fischer-Tropsch gasoline and diesel
- Some thoughts
 - The cheapest source of carbohydrates are sugars that are made available by milling/diffusion
 - Fibre should be partially, or fully, utilised as a source of renewable energy/power for value-added fuels or products
 - Proportion of fibre used for fuel/chemical production needs to be evaluated for each individual pathway – fuel production should be thermodynamically feasible
 - Further separation of sugars may be feasible for added value chemicals production
 - Economic feasibility will be guaranteed via integrated technologies with a portfolio of products
- Various biorefinery concepts were presented
 - Bio-isoprene
 - Bioplastics
 - Co-location of algal facilities – CO₂ and energy provided from sugar processing plant
- Key questions
 - What feedstock can be complementary to cane?
 - How many acres and where should it be planted?
 - What are the quality requirements for carbohydrate feedstocks?
 - What are the best integration scenarios?
 - How to evaluate economic and environmental impacts?