



# **THE CANE TRASH BURNER (CTB)**

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# UKZN School of Chemical Engineering

Renewable Energy Group

SMRI – Biorefinery Group

Pollution Research Group

Pulp and paper group

**Challenge** – collaborate – pool expertise &  
resources – encourage one another

In sugar industry we grapple with **Sustainability**

As an industry – we suddenly realise that unless we put in place effective interventions, many could be out of business soon

As an **educator** – I ask myself  
– could the same be true for me?

If I produce students that are good researchers  
- Have I accomplished my mission?

# Drawbacks of in-field burning

(up to 90% of cane in SA is harvested this way)



Air pollution



Possibility – runaway fires



Deterioration of cane if delays (dextran)



Waste of renewable energy (cane trash)

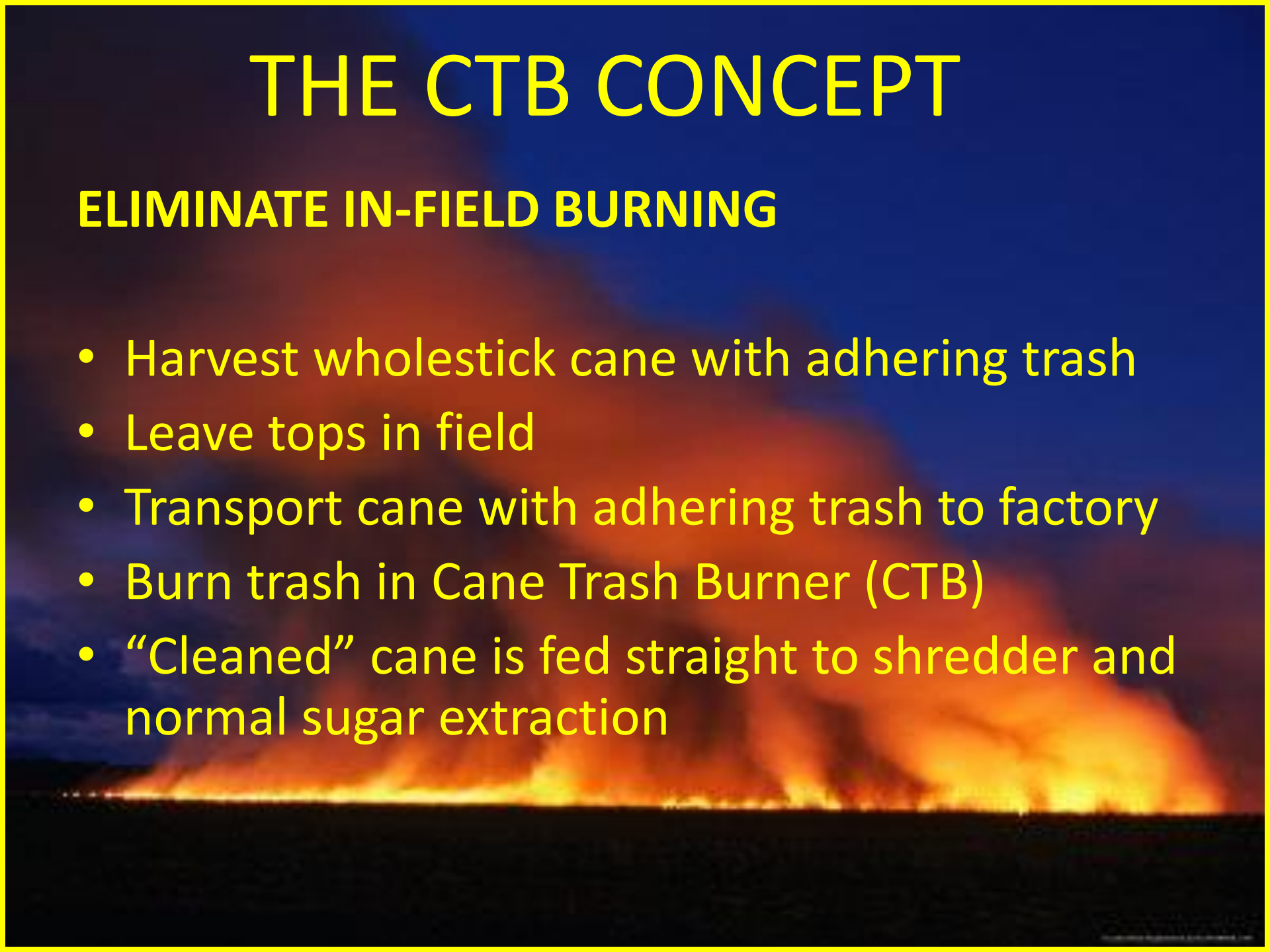


Soil deterioration (burn vegetable matter)

# THE CTB CONCEPT

## ELIMINATE IN-FIELD BURNING

- Harvest wholestick cane with adhering trash
- Leave tops in field
- Transport cane with adhering trash to factory
- Burn trash in Cane Trash Burner (CTB)
- “Cleaned” cane is fed straight to shredder and normal sugar extraction



# Advantages of the CTB

- No air pollution due to in-field burning
- Clean, fresh cane available in factory
- Energy value of cane increased by 30 – 35%
- Ash (fertiliser value) can be returned to the field

# Disadvantages



16% cane payload penalty



Harvesting green cane (snakes)



Different cane payment system



# EARLY TESTS



## PILOT PLANT

- Cane ignited by gas burners
- Fed through burner at a controllable rate (using variable speed motor – vary residence time)



# RESULTS

Trash burned off well



No detectable burn damage on cane

Once ignited, fire self-sustaining, provided no interruption in feeding



## ENERGY VALUE OF TRASH

Typically 1 ton cane contains 150 kg trash

At 20% moisture, 6.5% brix, 1.5% ash

Energy value of trash = 13.6 MJ/kg

Energy value of coal = 27.5 MJ/kg

Every ton cane with trash has additional energy value equivalent to 74 kg coal

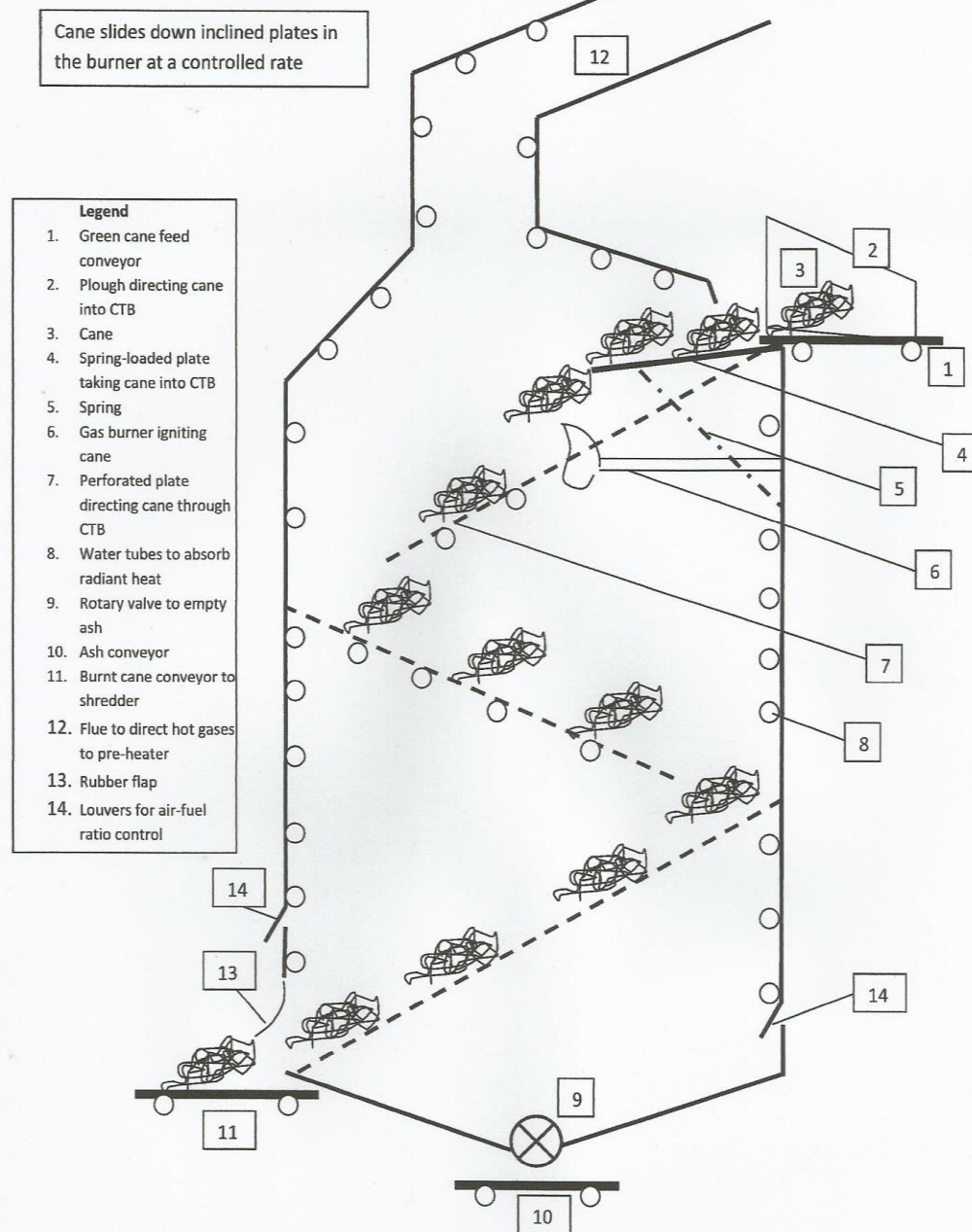
For **300 TCH** factory, **22.2 tons coal energy equivalent brought in every hour**

# CHALLENGES

- Size of full-scale burner
- Continuous feed of cane to burner
- Control of residence time in burner – avoid damage to cane

# Conceptual Design FULL-SCALE CTB

Figure: Conceptual Design for Full-scale Cane Trash Burner (FCTB)



# CURRENT WORK

- A patent has been registered on the full-scale concept
- Funding has been obtained for an intermediate scale CTB demonstration unit
- Presently designing and constructing intermediate scale unit
- Tests will centre largely around controlled movement of cane through burner, but will record other info such as fouling, burn temperature, heat transfer rates

# POSSIBLE USES

- Low pressure steam
- Preheat boiler feed water
- Bagasse drying

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**Thank you**

**QUESTIONS?**