



# ClearFuels Technology Inc.

## Hawaii Energy Policy Forum

August 20, 2007

### Production of Fuels Food and Energy from Biomass

Robert Shleser - CTO

Enabling Highly Efficient Low Cost Sustainable Energy Production



# ClearFuels Technology Inc

This is a discussion about:

## **BIOMASS ENERGY OPPORTUNITIES**

### **GOALS**

**Review the biomass energy, liquid fuels situation**

**Discuss potential opportunities**

**Identify synergies**

**Understand and preserve our options**

# **CORN-ETHANOL ISSUES**

# Corn Cellulosic Ethanol



grain



**Traditional Corn-Ethanol Plant**



stover



**Stover Gasification Plant**

# CORN- (not the total answer)

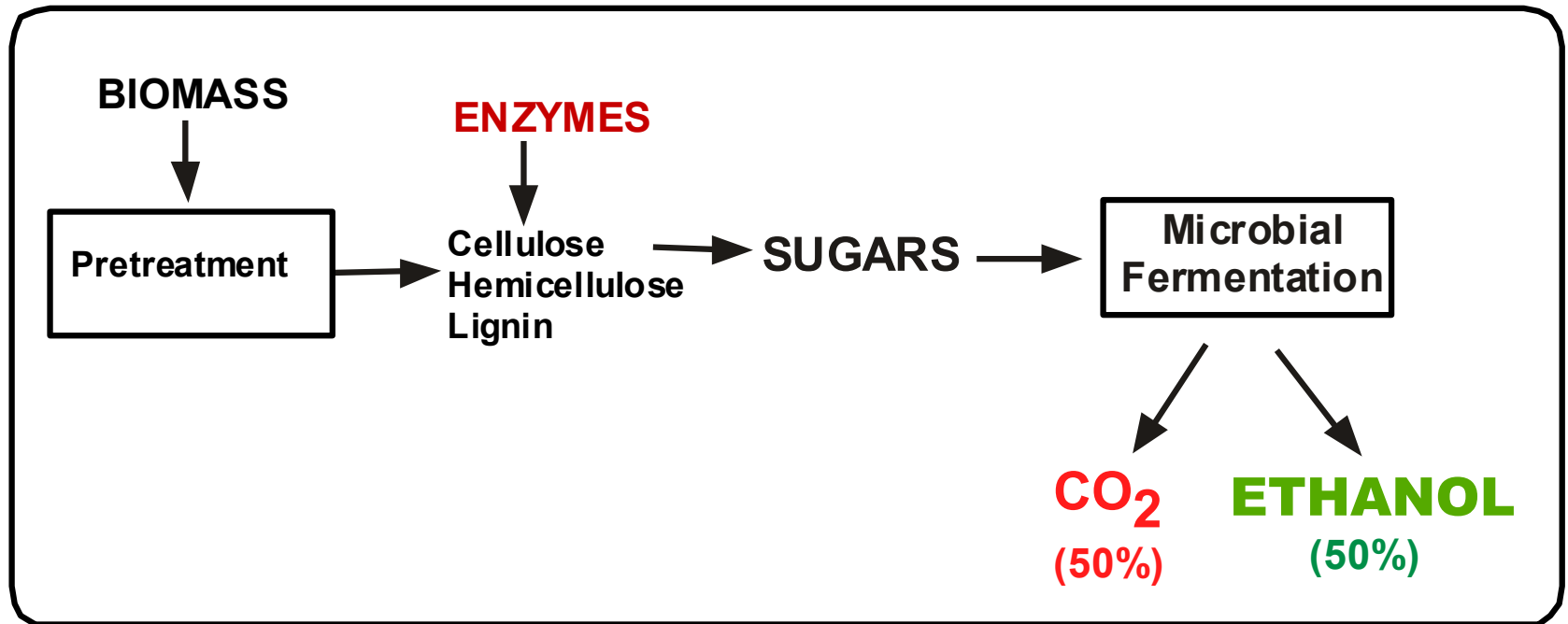
In a document “The Case for Ethanol” Anna Halpern-Lande states:

- Using cellulosic waste will be critical if ethanol markets are to mature.
- The energy bill creates a nationally mandated threshold to 7.5 billion gallons,
- We simply will not have enough corn.
- Our capacity to produce corn-based ethanol will max out at around 10 billion gallons,
- Corn stover- the stalk and leaves from corn alone would add 7 to 12 billion gallons of ethanol capacity.

# Cellulosic Technology

**BIOMASS PRODUCTS**

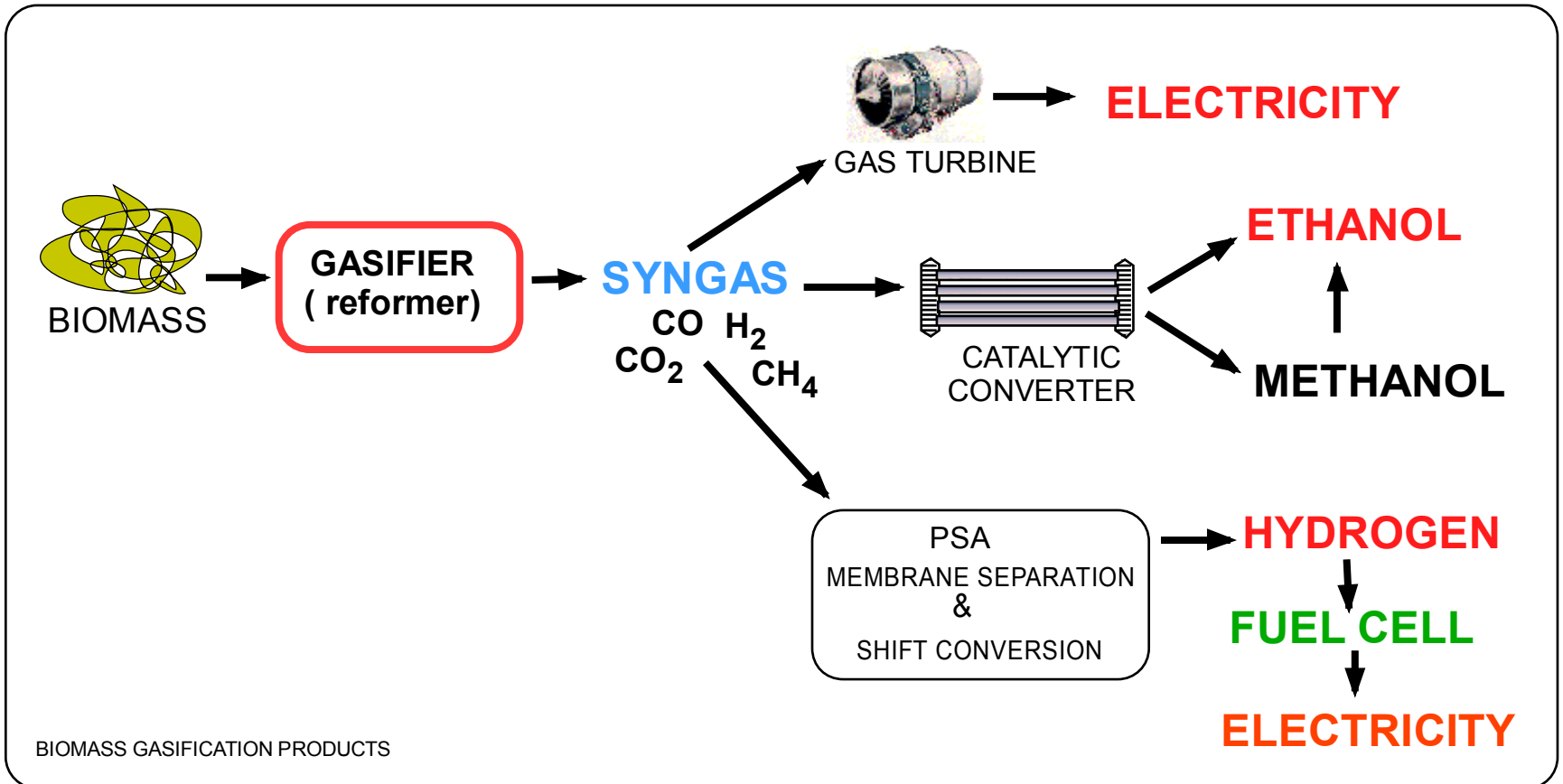
# Sugar Release & Fermentation





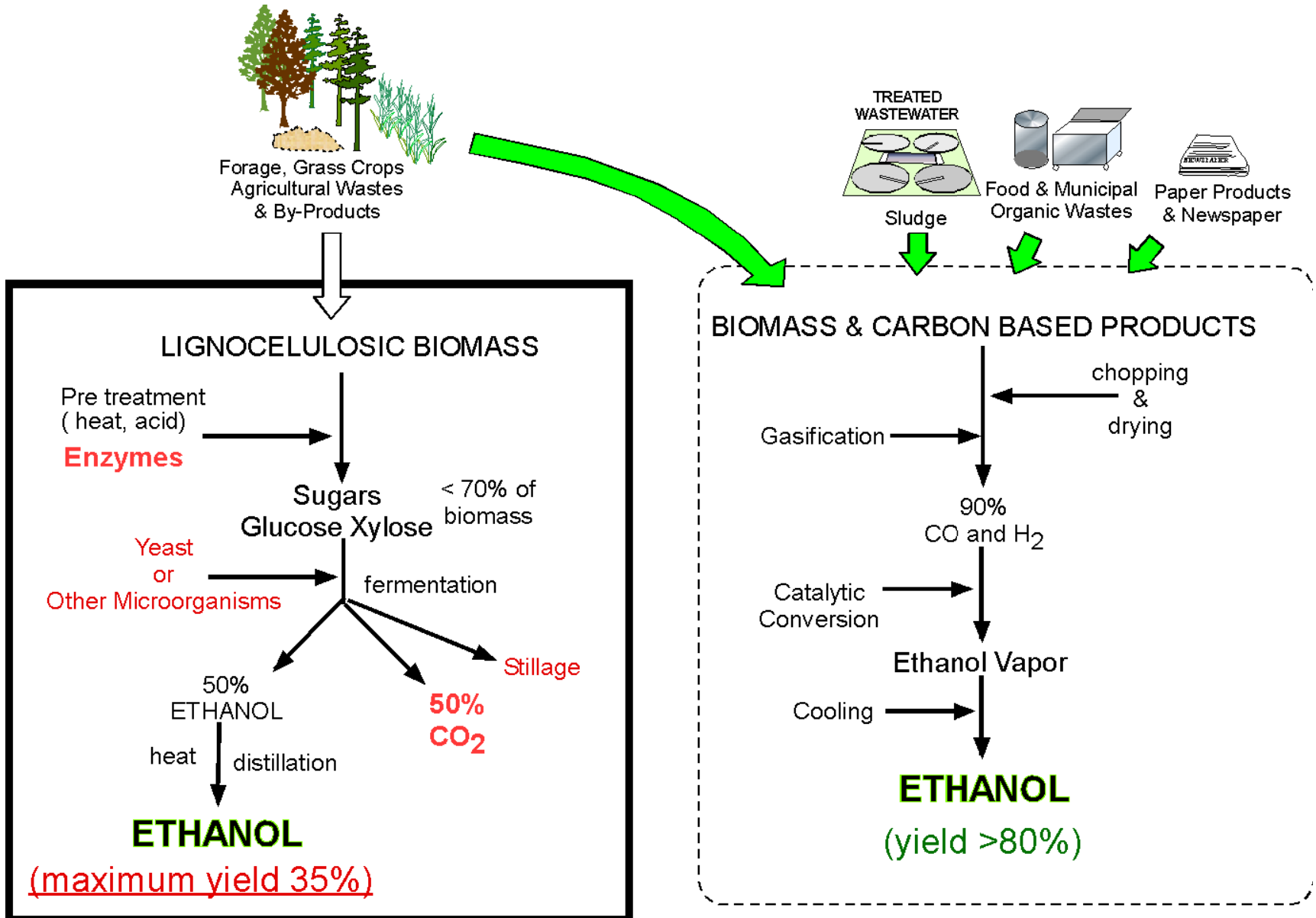
# ClearFuels – Pearson Technology

## BIOMASS GASIFICATION OPTIONS

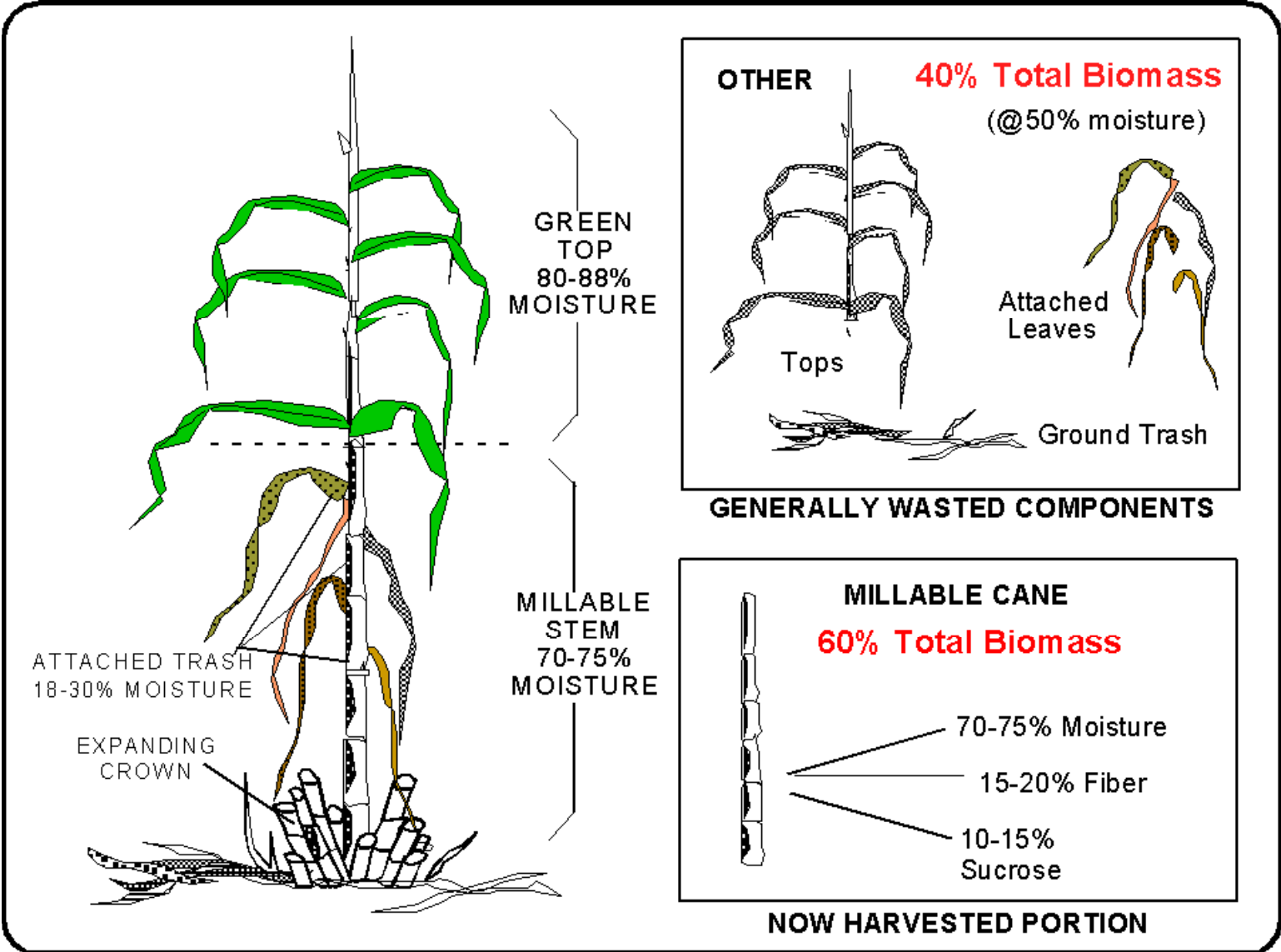




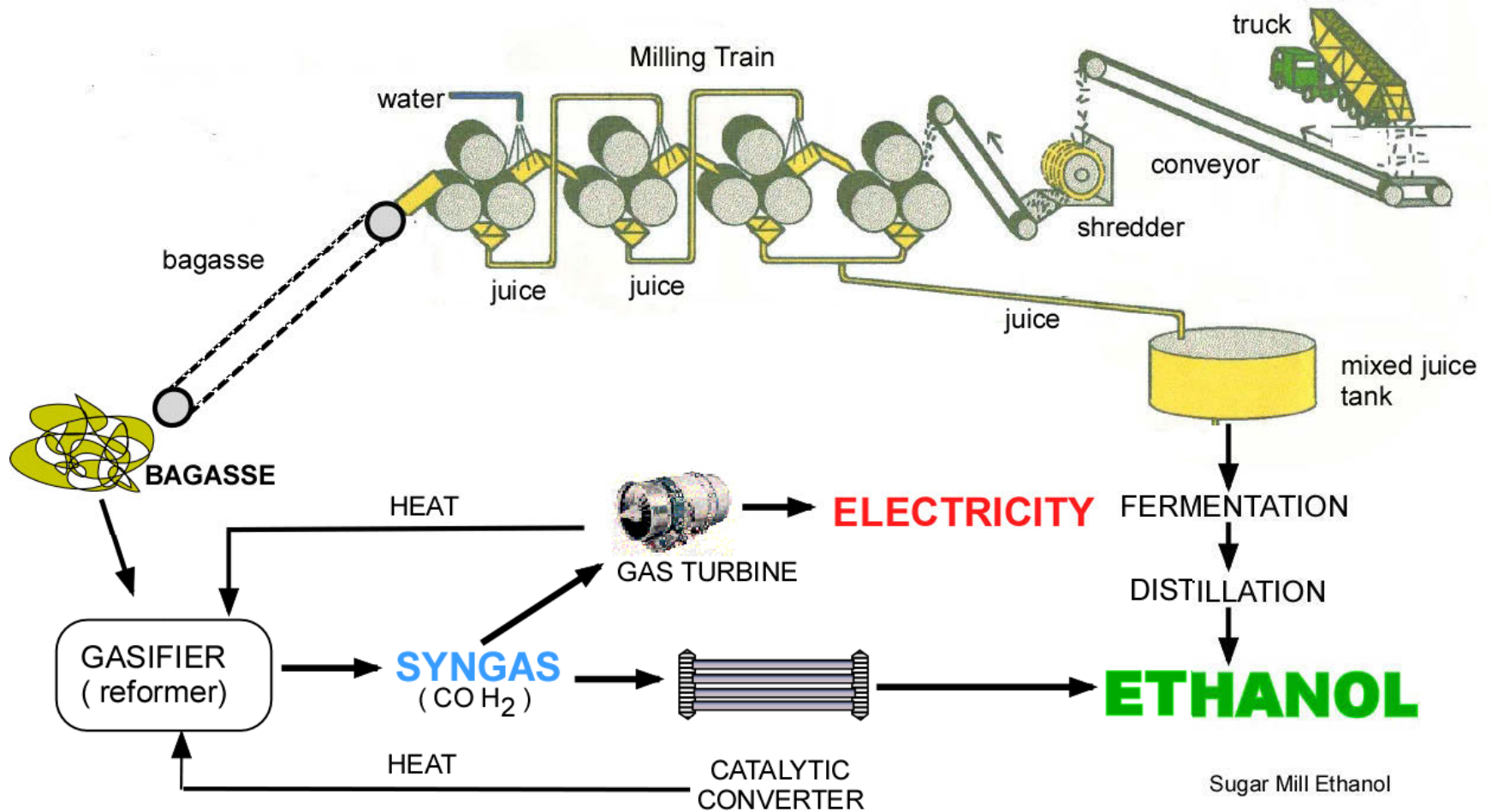
# Cellulosic Ethanol Technologies



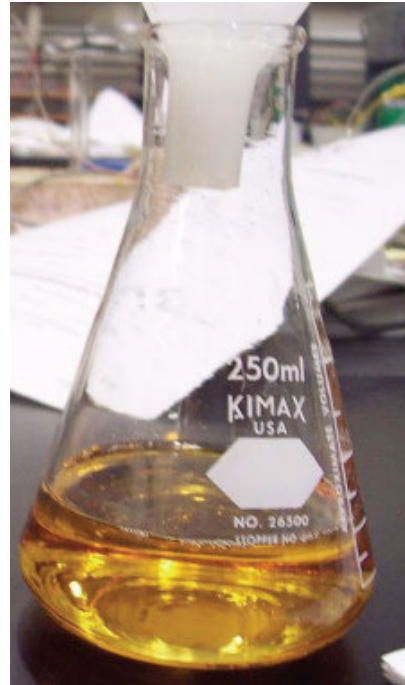
# Sugar Crop Biomass



# Integrated Sugar Crop Ethanol Production Business

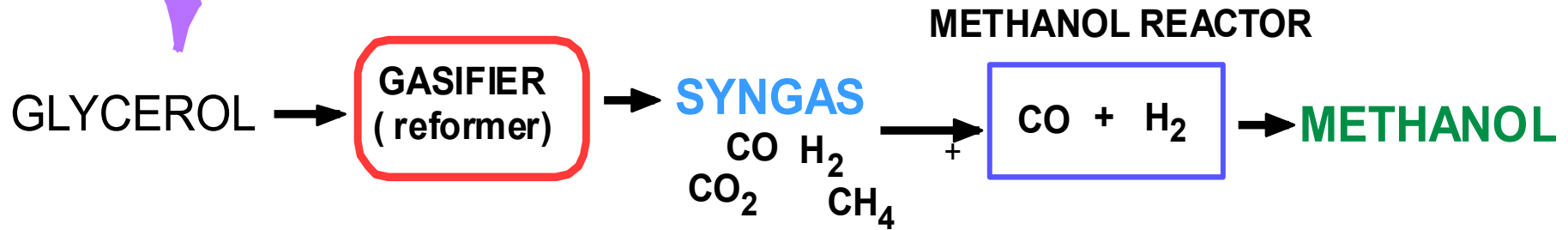
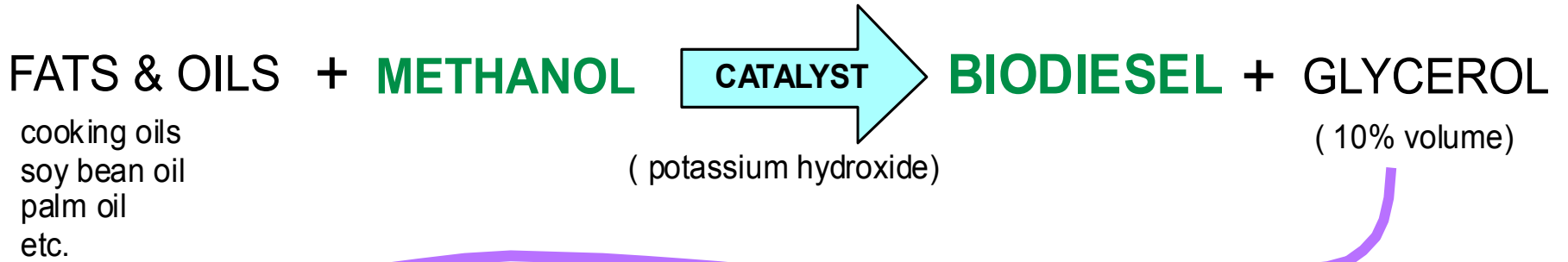


# BIODIESEL



**METHANOL from GLYCERINE**

# OIL > BIODIESEL > GLYCEROL > METHANOL

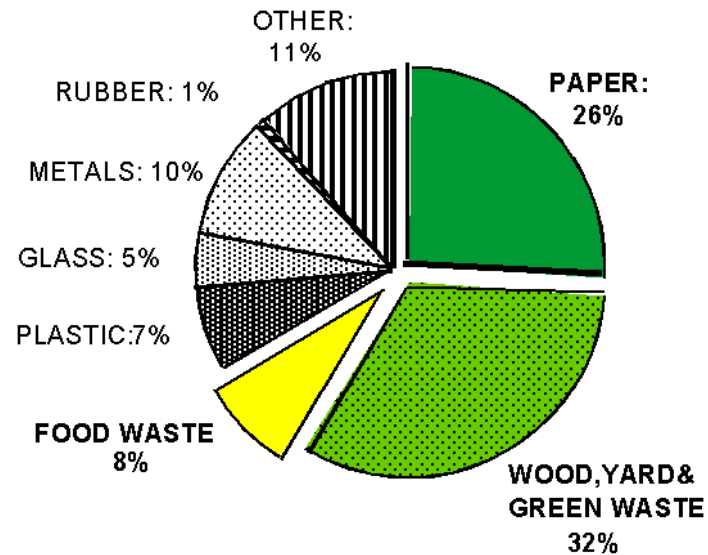


# Hawaii MSW Opportunities

## HAWAII MSW COMPOSITION

### MSW - ENERGY/ ETHANOL POTENTIAL

Paper.....	24%
Food.....	8%
Wood Yard Green.....	32%
<hr/>	
TOTAL.....	64 %



# Oahu – Waste to Ethanol

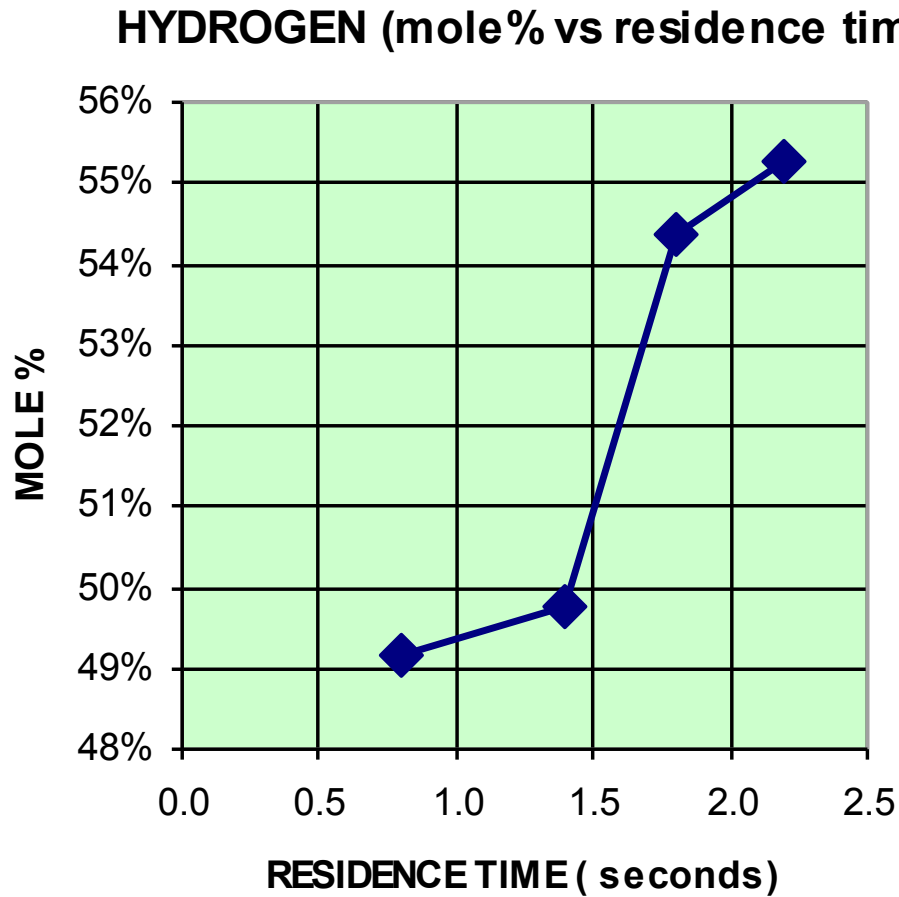
ETHANOL from MSW		
(OAHU ANNUAL ETHANOL FROM MSW )		
Nov-04		
Oahu Population	900,000	
Oahu annual Waste (tons)	1,600,000	
Ethanol gallons / ton	110	
WASTE COMPONENT	Percent of total	Annual Amount ( tons)
<b>Paper</b>	26.20%	419,200
<b>Yard Waste</b>	17.90%	286,400
<b>Wood</b>	12.00%	192,000
<b>TOTAL</b>	<b>56.10%</b>	<b>897,600</b>
<b>Annual Ethanol (gal)</b>	<b>98,736,000</b>	
<b>Annual Gasoline Consumption (gal)</b>	<b>400,000,000</b>	
<b>Ethanol / Gasoline %</b>	<b>25%</b>	

# **HYDROGEN FROM BIOMASS**

**( reformation technology)**

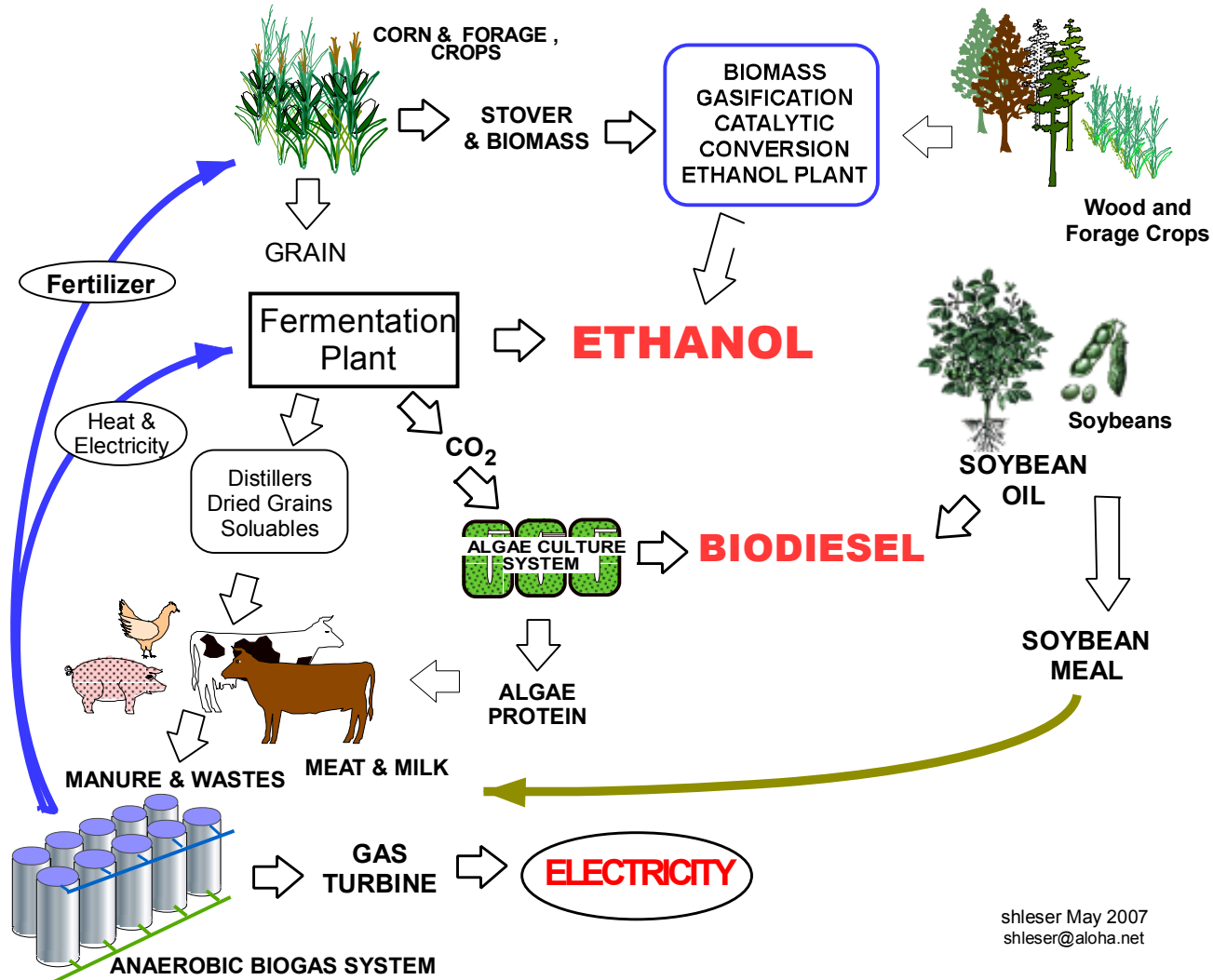


# Increasing Hydrogen Yield



# PLUGGING THE HOLES

## Integrated Crop Biomass Feedlot Fuel



# BIOMASS OPPORTUNITIES

- Biomass can be a big energy opportunity !
- All hydrocarbons can be part of the equation
- We need an analysis of the available and potential resource base
- We need a financial analysis of the supply train for each technology
- Government and the private sector must make a commitment to developing these resources
- Hawaii can be a leader as a **center for biomass energy technology demonstration and transfer**

# **BIOMASS TECHNOLOGY**

## **CONCLUSIONS**

**Everything is tied together**

**Waste can be our**

**“Most Sustainable Resource”**

**Wasting Waste is Wasteful !**



# ClearFuels Technology Inc.

## THANK YOU

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