

California Energy Commission

**DOCKETED**

**11-ALT-1**

TN # 66418

AUG 01 2012



**California Energy Commission  
Lead Commissioner Workshop  
Advanced Ethanol Production in California  
August 1, 2012**



**Mendota Bioenergy, LLC**

# Overview

## Summary

- About Mendota Bioenergy
- Current Project Status
- Commercial Plant Highlights

## Feedstock

- Energy Beets as a Feedstock
- System Yield
- California Agriculture

## Benchmarking

- Competitive advantages
- Carbon Intensity

## Conclusion

- Q&A and contact info



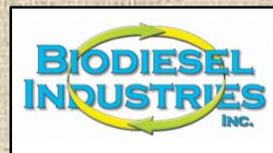
# About Mendota Bioenergy

## History

- Spreckels sugar plant shut down in 2008, marking an end to 100+yrs of sugar beet production in California's Central Valley
- Mendota Advanced Bioenergy Beet Cooperative formed in 2008
- Mendota Bioenergy, LLC formed in Jan 2011 to pursue integrated biorefinery

## Grower-led Consortium

- Grower-led consortium project of top tier organizations:



# Current Project Status

## Work progressing under \$1.5M CEC grant

- Technical work on ethanol, digester, gasifier and WWT plants (IR1 Group)
- Lab & pilot scale research; life cycle analysis (UCD)
- Feedstock planning (CSUF, MABBC)
- Agricultural best management practices, certification (SureHarvest)
- Finished product contracting, financing, fx modeling (IR1 Group)
- Approx 16mos in to 2yr grant period
- Significant achievements in technical, research and feedstock areas
- Moving into pilot scale testing, detailed technical work, detailed modeling

## Development Timeline

- 2yr demonstration scale project w/ target start date Jan 1, 2013 & 1 yrs ops starting Fall 2013
- 2yr planning, design, engineering & construction of commercial scale plant
- Commercial operations in Fall 2016



UCD pilot scale anaerobic digester

# Commercial Plant Highlights

## Feedstocks

- Advanced ethanol plant: 35,000 acres / 1,400,000 wet tons energy beets
- Digester: 3,000 bdt stillage, 5,000 bdt Jose Tall Wheat Grass, 3,500 bdt food waste
- Biomass gasifier: 55,000 bdt wood chips from orchard prunings/removals

## Plants, Processes & Products

### Advanced Ethanol Plant

- 40 MGY of Advanced Biofuel Ethanol
- Potential to convert to 20 MGY of drop-in jet and diesel fuels

### Anaerobic Digester

- ~700,000 gallons per year diesel equivalent of BioCNG

### Biomass Gasifier

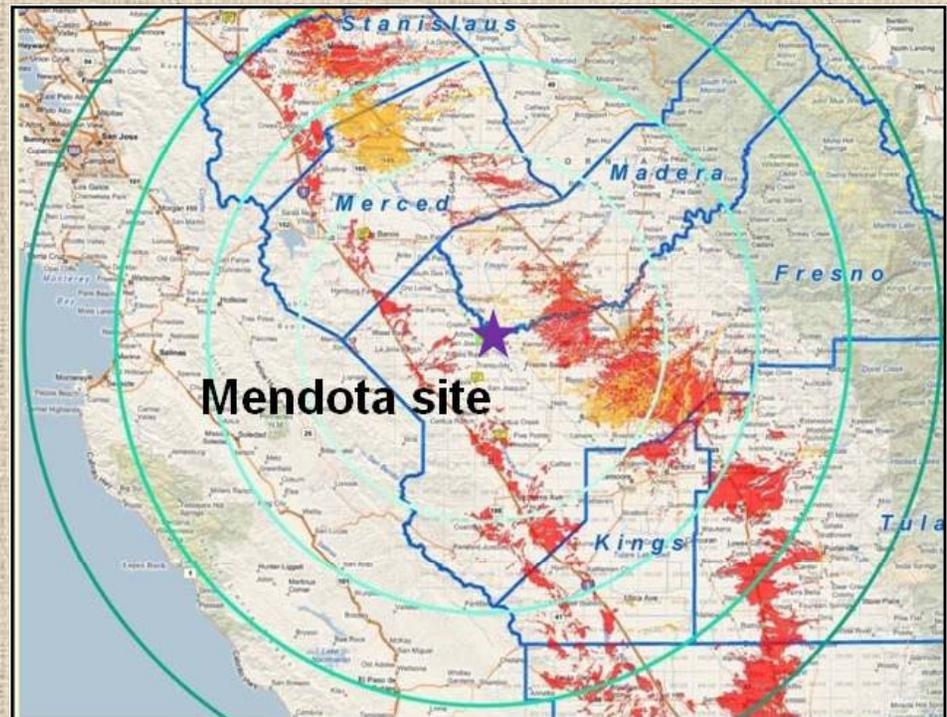
- Process heat & approx 40% of internal electricity demand

### Waste Water Treatment Plant

- Produce ~400 acre-feet/yr of treated water for irrigation

# Energy Beets as a Feedstock

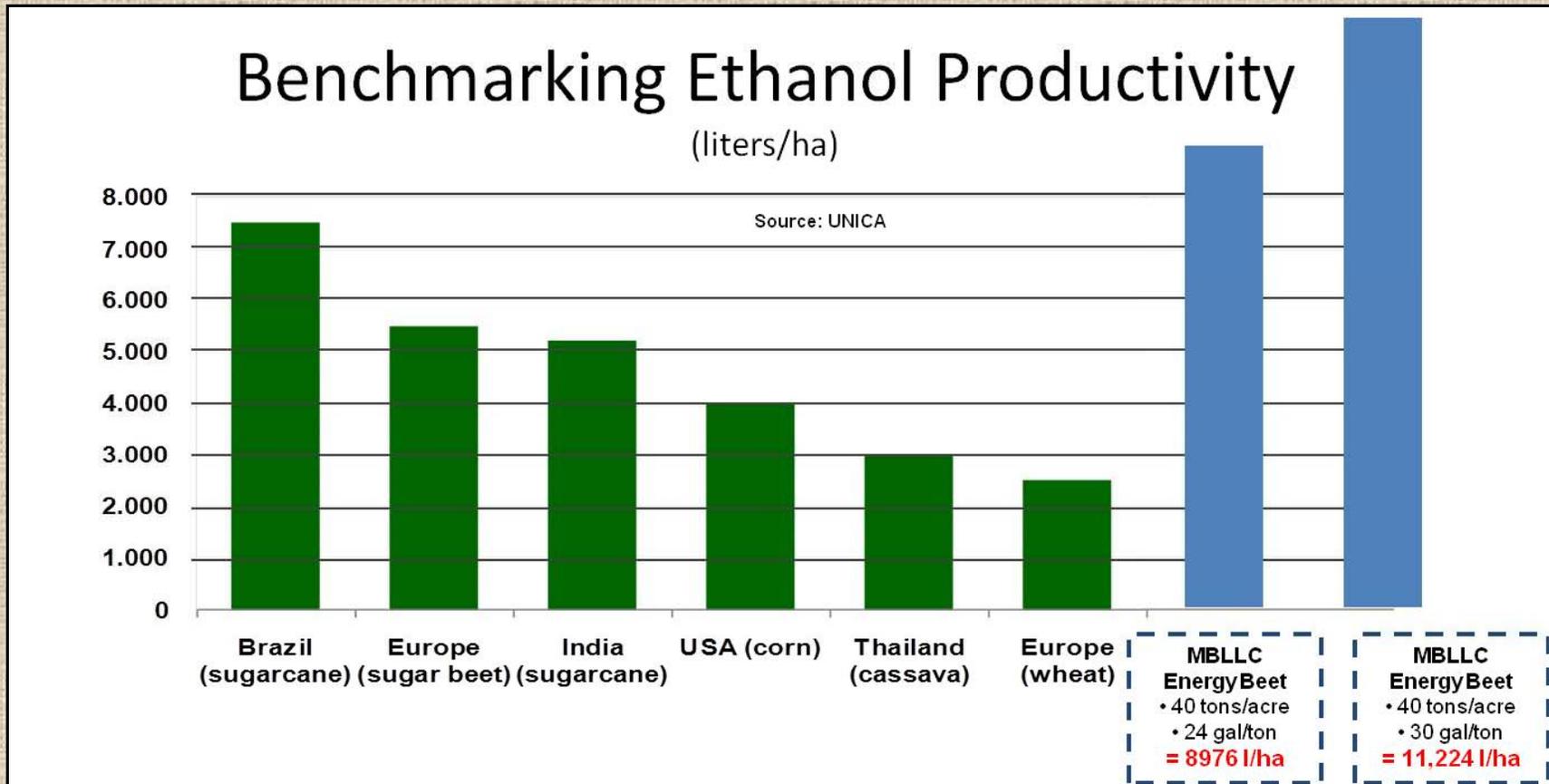
- Year round harvest - 4,000 tons/day (160 trucks/day)
- ~16,300 acres of sugar beets grown for Spreckels Sugar plant around the Mendota site as recently as 2008
- Central Valley historically supported 100,000+ acres
- High productivity (1200+ gal/acre)
- Grower payment system based on btu's/acre *and carbon intensity of growing practices*



Harvest region (concentric rings are 40, 60, 80,100 miles)

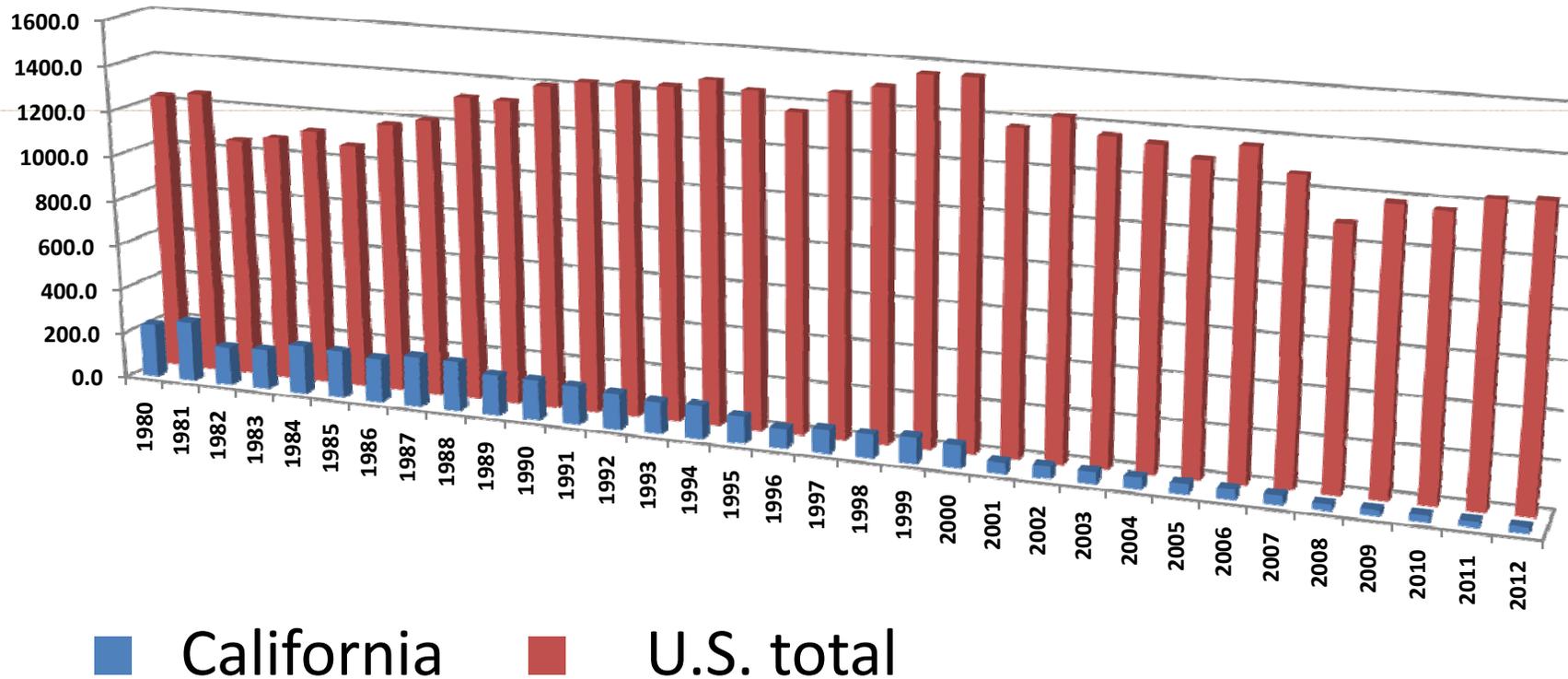
# Benchmarking Ethanol Productivity

(liters/ha)



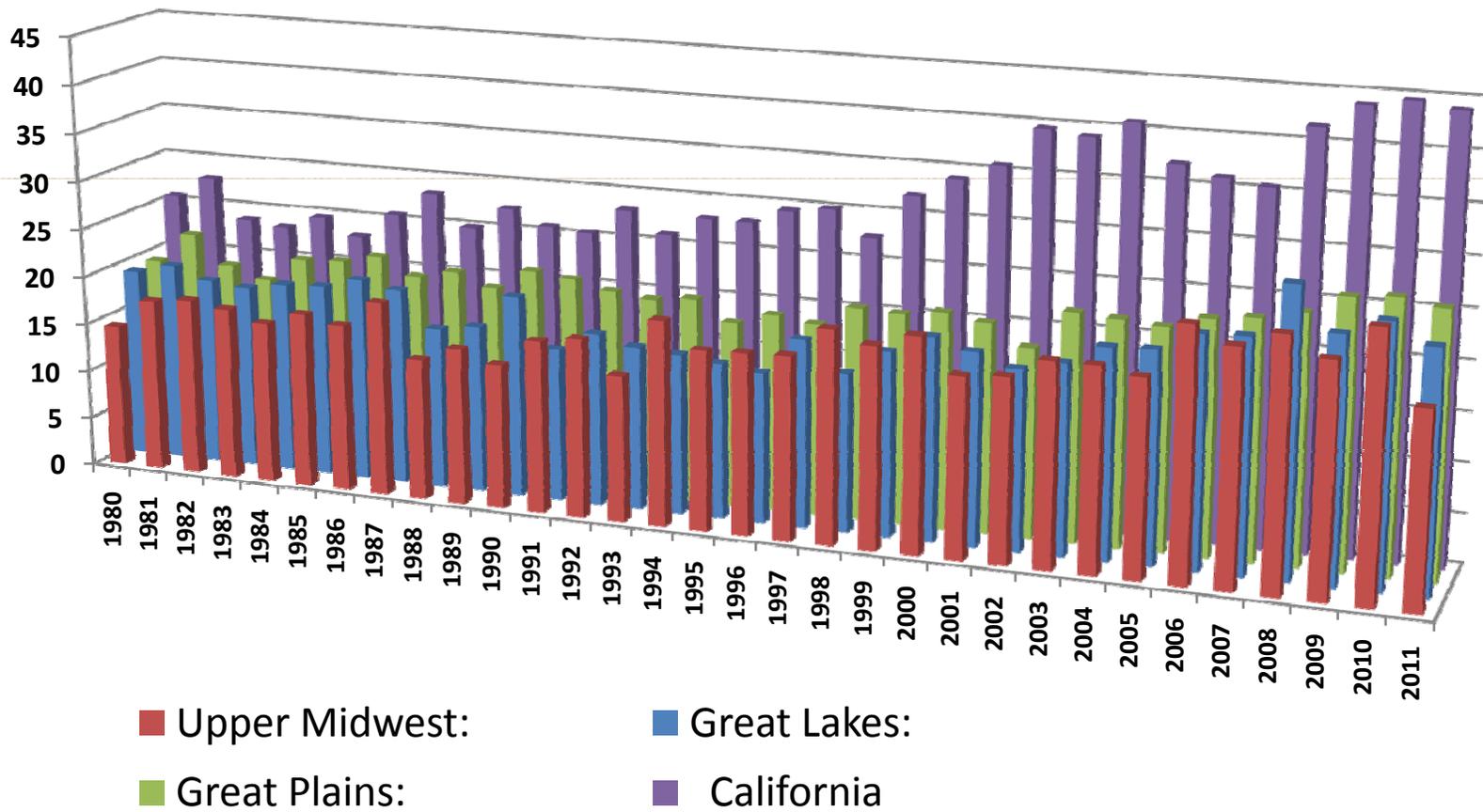
# California Agriculture (1)

California & U.S. Sugar Beet Area Planted ('000 acres)



# California Agriculture (2)

## Sugar Beet Yields (tons/acre)



# Competitive Advantages

## Cost competitive w/ Midwest corn plants

- Cost of production = Midwest corn plant at \$5-6/bu
- Stable feedstock pricing through available long term contracts
- Potential product offtake contracts with conversion to drop-in jet and diesel fuels

## Low technological risk, significant yield upside

- Simple first gen fermentation/distillation of simple sugars
- Room for improvement on 40 tons/acre and 30 gal/ton

## Low carbon fuel

- California's Low Carbon Fuel Standard creates local demand & premium
- Estimated Carbon Intensity = <20

# California's LCFS Carbon Intensity of Alternative Fuels

California Air Resources Board – Jan 6, 2011

Fuel	Pathway Identifier	Pathway Description	Carbon Intensity Values (gCO <sub>2</sub> e/MJ)		
			Direct Emissions	Land Use or Other Indirect Effect	Total
Gasoline	<u>CBOB001</u>	CARBOB - based on the average crude oil delivered to California refineries and average California refinery efficiencies	95.86	0	95.86
Ethanol from Corn	<u>ETHC001</u>	Midwest average; 80% Dry Mill; 20% Wet Mill; Dry DGS; NG	69.40	30	99.40
	<u>ETHC002</u>	California average; 80% Midwest Average; 20% California; Dry Mill; Wet DGS; NG	65.66	30	95.66
	<u>ETHC003</u>	California; Dry Mill; Wet DGS; NG	50.70	30	80.70

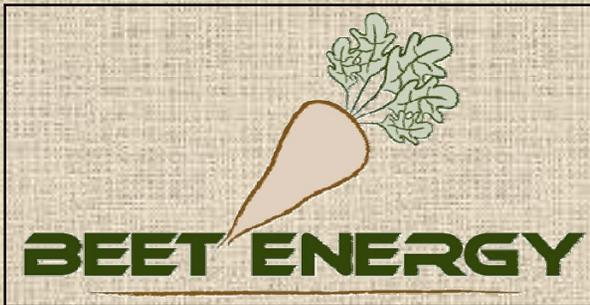
Plus 20+ corn ethanol applications that range from ~73-92 gCO<sub>2</sub>e/MJ

Ethanol from Sugarcane	<u>ETHS001</u>	Brazilian sugarcane using average production processes	27.40	46	73.40
	<u>ETHS002</u>	Brazilian sugarcane with average production process, mechanized harvesting and electricity co-product credit	12.40	46	58.40
	<u>ETHS003</u>	Brazilian sugarcane with average production process and electricity co-product credit	20.40	46	66.40

Plus 3+ sugarcane ethanol applications that range from ~64-79 gCO<sub>2</sub>e/MJ

**Mendota Bioenergy Initial CI = <20**

# Q&A



**Jim Tischer**

[jtischer@mendotabeetenergy.com](mailto:jtischer@mendotabeetenergy.com)

559-260-6148



**Jeff Manternach**

[jeffm@ir1group.com](mailto:jeffm@ir1group.com)

559-269-2552

