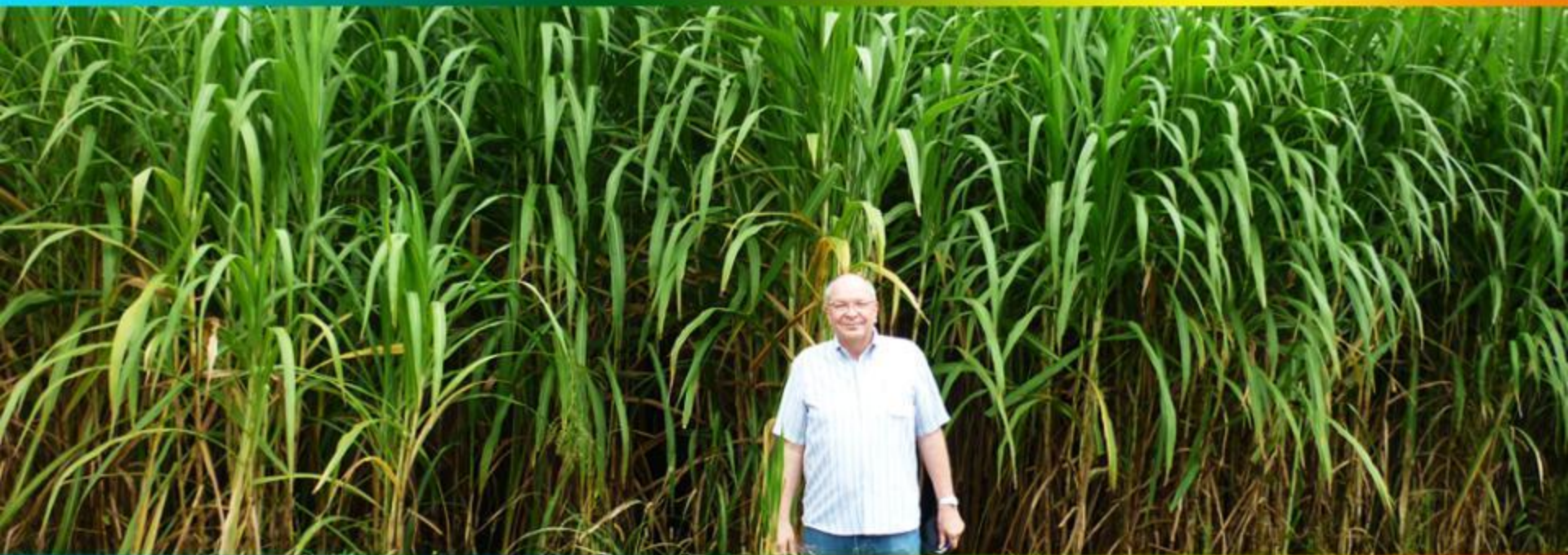


Giant King Grass: Biorefinery Feedstock & Fuel for Bioenergy



Clean Energy for a
Cleaner Tomorrow



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- VIASPACE is a publicly traded company on the US OTC Bulletin Board
 - VIASPACE stock symbol VSPC.OB
- VIASPACE headquarters in the US with activities in China and other countries

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- Giant King Grass is a high yield, fast growing dedicated and sustainable energy crop



- Giant King Grass is the lowest cost cellulosic feedstock for a biorefinery
- Co-location of biorefinery with Giant King Grass plantation greatly simplifies logistics
 - Sugar-based biorefineries are co-locating to Brazil to reduce costs
- New approaches of just-in-time harvesting and using wet biomass further reduce costs
- Giant King Grass can also fuel boilers to produce process heat, steam & electricity for a “green” biorefinery

Giant King Grass Enables a “Closed Loop Biorefinery”

- Water and sunshine come in
- Biofuels, biochemicals, biomaterials and bioelectricity come out



Giant King Grass



- Versatile, very high yield, non-food dedicated energy crop
 - Perennial in tropical and subtropical regions
 - Does not survive a long freeze
 - Harvest 2-3 times/year
- High yield translates into high land use efficiency and low cost
- Fuel for electricity generation
 - Burn directly or pelletize for co-firing
- Feedstock for cellulosic biofuels, biochemicals & bioplastics

Applications of Giant King Grass

- Direct combustion in electric power/heat/steam plant
- Pellets for co-firing with coal
- Briquettes for boilers
- Biogas /anerobic digestion
- Cellulosic liquid biofuels--ethanol/butanol
- Pyrolysis to bio oil
- Catalytic conversion to bio diesel
- Biochemicals and bio plastics
- High-temperature gasification
- Torrefaction to bio coal
- Pulp for paper and textiles

**Applications that
are commercial today
with other feedstock**

**Low cost of
Giant King Grass
will allow
commercial
applications
in future**

Giant King Grass

- Very high yield
 - 44 dry US tons/acre/year
 - 100 dry MT/ha/year
- Not genetically modified
- Not an invasive species
- First harvest in 6 ½ months
- Needs sunshine, warm weather & rain or irrigation
- Sustainably grown
- Fertilizer use is modest
- No pesticide



Giant King Grass -4.5 m tall (14.7 feet)



Giant King Grass for Fermentation-Based Biorefinery



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<i>Composition Dry Weight %</i>	Giant King Grass	Corn Stover	Miscanthus
<i>Glucan</i>	43.0	37.4	44
<i>Xylan</i>	22.3	21.1	22
<i>Arabinan</i>	2.9	2.9	2
<i>Lignin</i>	17.4	18.0	17
<i>Ash</i>	4.5	5.2	2.5-4

Notes and references:

Giant King Grass: average of samples cut at 4 m tall

Corn Stover: Aden et al. NREL/TP-510-32438, 2002

Miscanthus: Murnen et al. Biotechnology Progress 23, 4, 846-850, 2007 and other sources

Giant King Grass tests by 3 independent companies.

Giant King Grass has essentially the same composition as corn Stover and miscanthus per dry ton

Pretreatment & Enzymatic Hydrolysis



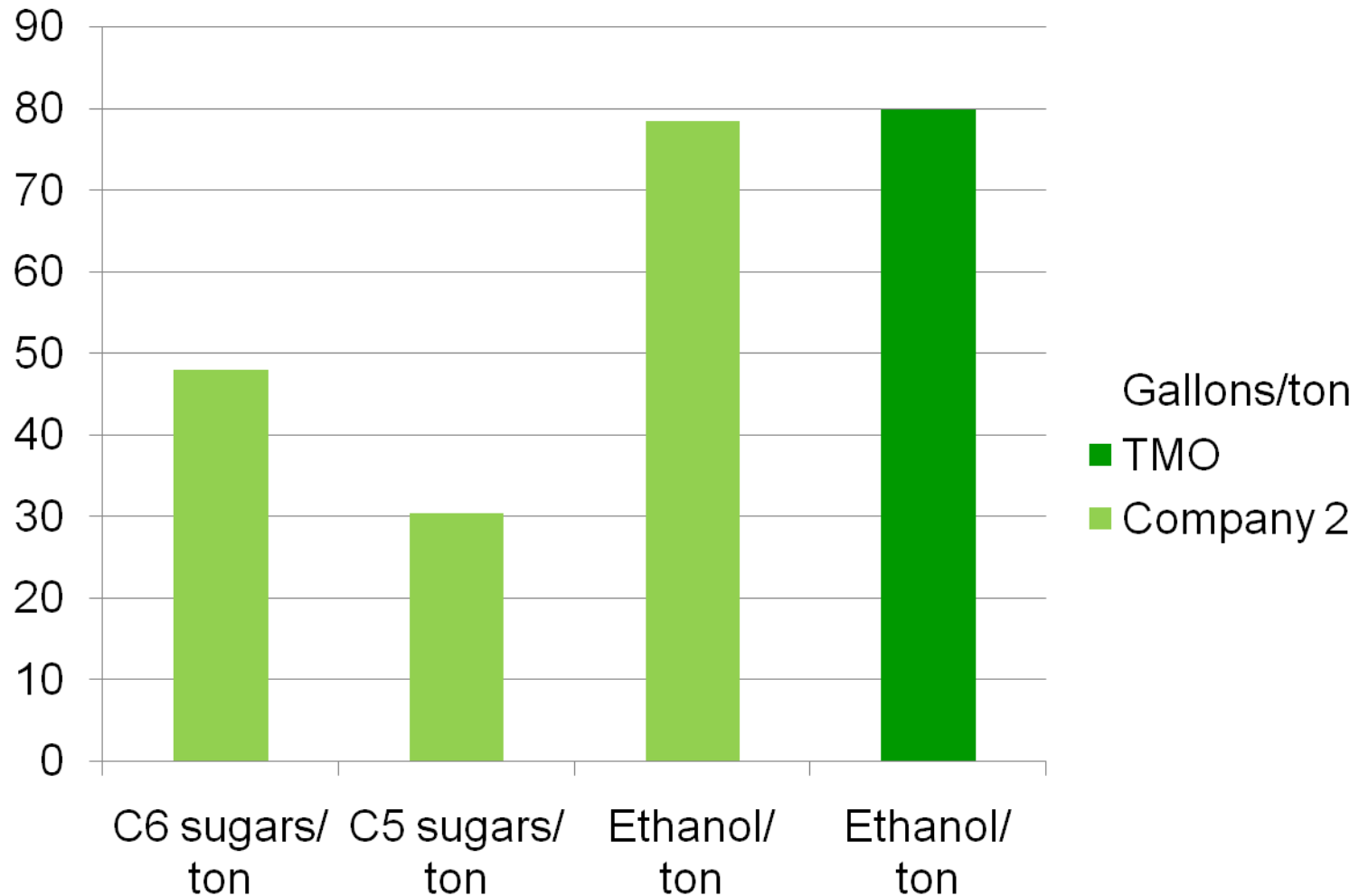
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- Conversion of hemicellulose (xylan) to xylose >90%
- Conversion of cellulose (glucan) to glucose >85%
- “Giant King Grass ethanol production is very similar to corn straw and Giant King Grass is probably easier to process”

Sugar Data & Projected Ethanol Yield (gal/ US ton)



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Compare Giant King Grass Yield to Corn & Miscanthus



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Yield Dry Matter	Giant King Grass	Corn Stover	Miscanthus
US ton/acre	44	3.5-4.7	14-18
Metric ton/ha	100	8.6-11.6	30-40

Yield: The yield comparison amongst Giant King Grass, corn Stover and Miscanthus is not an exact apples-to-apples comparison.

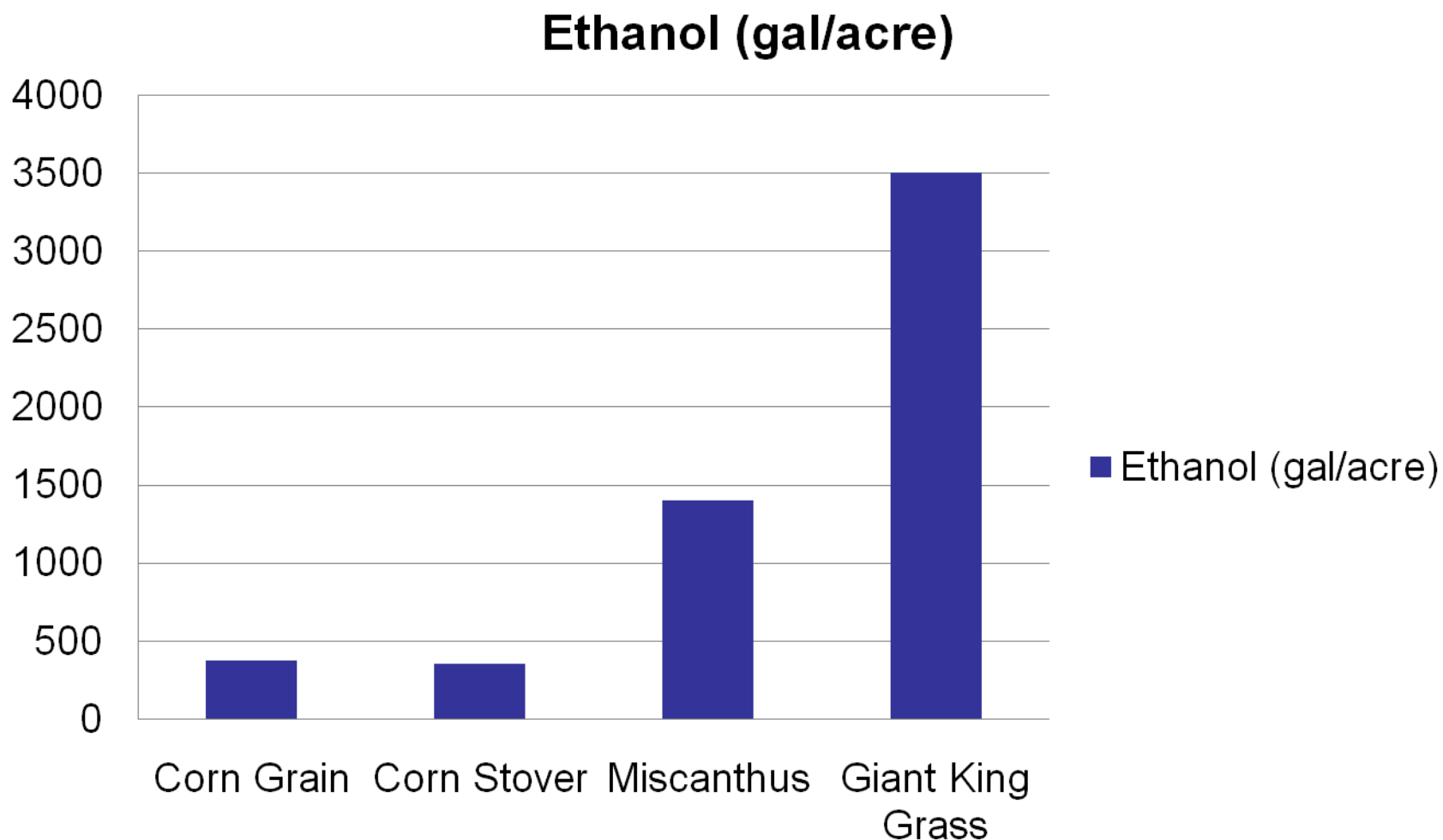
- Corn will grow in cold areas, whereas Giant King Grass cannot tolerate freezing temperatures
- Corn is an annual crop and must be planted every year which causes additional expense. The annual planting also has issues for soil erosion, soil organic matter and some of the corn and wheat must be left on the field for nutrient recycling and to mitigate soil erosion, etc.
- Giant King Grass and Miscanthus are both perennial grasses. Giant King Grass requires tropical and subtropical regions and can be harvested several times a year for many years. Miscanthus will grow in cold areas.

Land-Use Efficiency

How Many Gallons/Acre?



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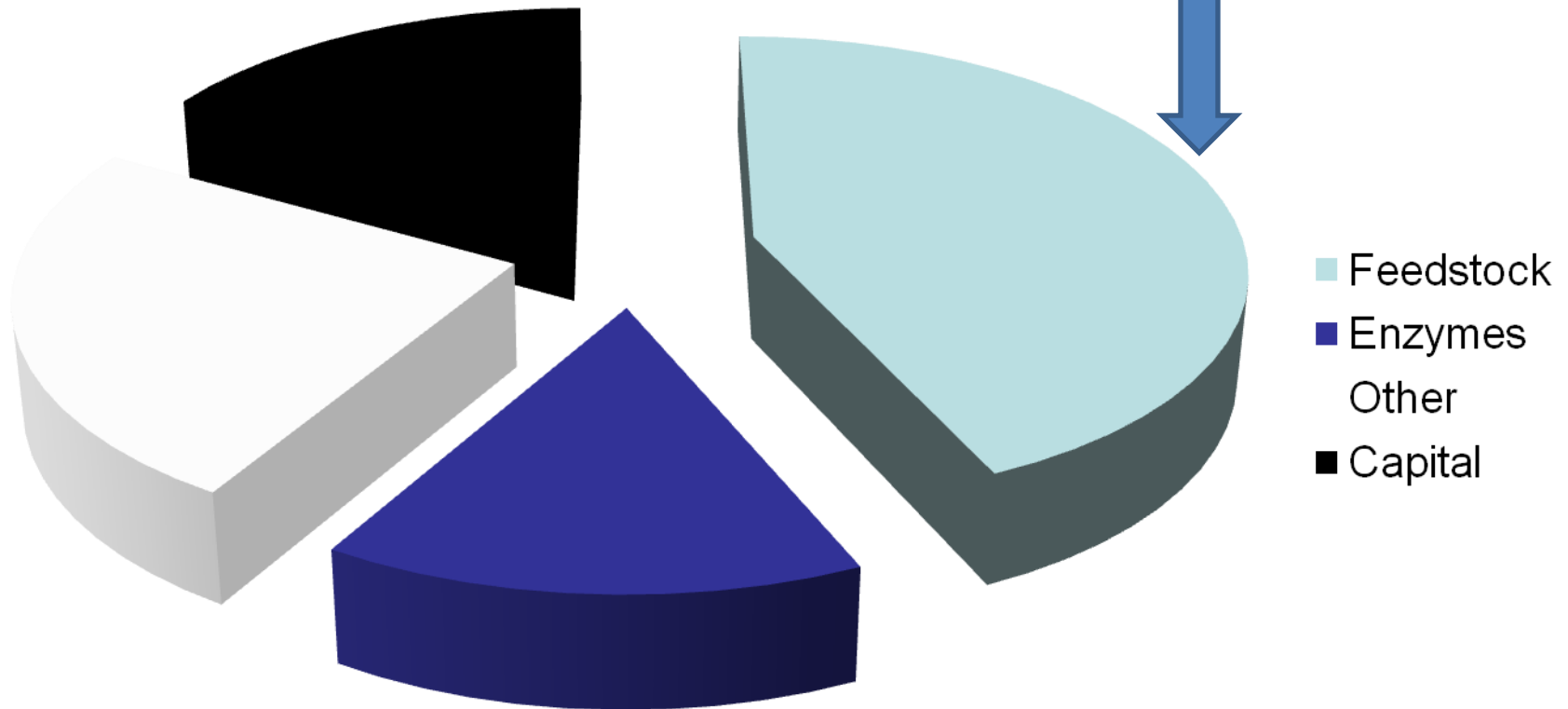


Feedstock is the Largest Cost of Cellulosic Ethanol



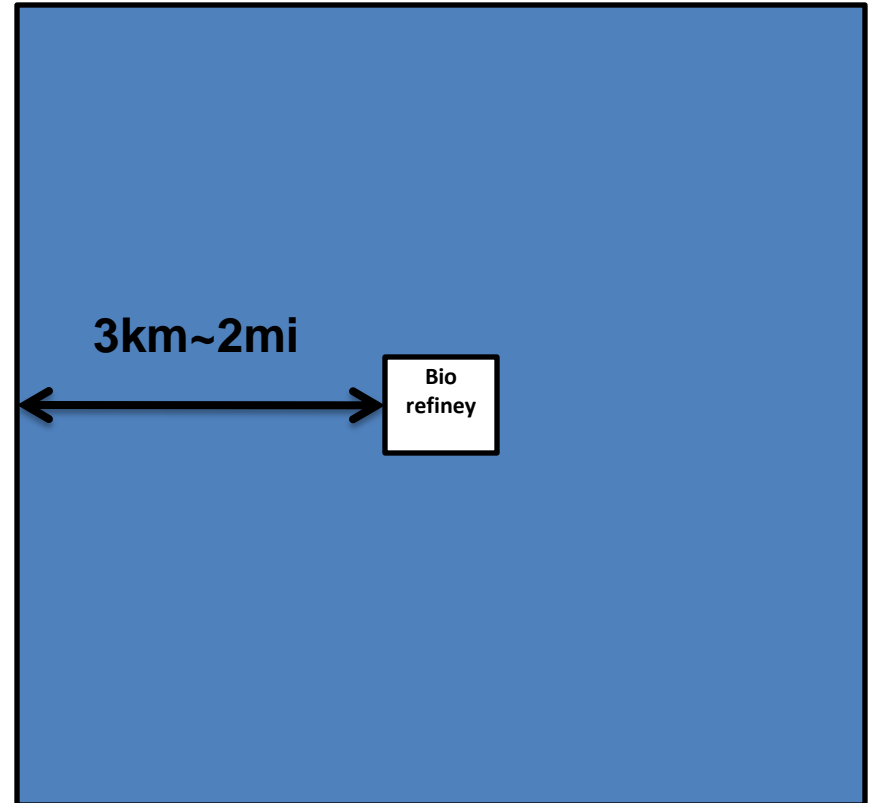
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**Giant King Grass and
co-location can reduce
feedstock cost by 40-50%**



Advantages of Co-location & New Approaches

- With GKG, 25 Million ethanol gallon/year (95M L) can be produced on 7900 acres (3200 hectares)
- Process biomass at plantation and ship finished (or intermediate) product
- Maximum transport distance is <3km (2mi)



Giant King Grass and Factory



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- 110 ha (270 acre) test site provides**
- seedlings for large energy projects**
- demonstration of production**
- sample quantities for customers**



Note CEO standing at lower right . Giant King Grass is 4 m tall

Giant King Grass After Harvest



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Field dried grass and regrowth 10 days after harvest

Field Dried Grass & Regrowth



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Field Dried Grass Transported to Nearby Factory



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Co-location of plantation and factory means grass does not need to be baled

Chipper, Rotary Dryer and Hammermill



Advantages of Co-location & New Approaches



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- Giant King Grass in a warm/tropical area can be harvested all year long
 - Not tied to maturing of food crop
- Sequential harvesting of GKG crop to provide only the amount needed by biorefinery each day---provides steady jobs and minimizes need for temporary, seasonal workers
- “Just in time harvesting” minimizes need to store GKG

Advantages of Co-location & New Approaches



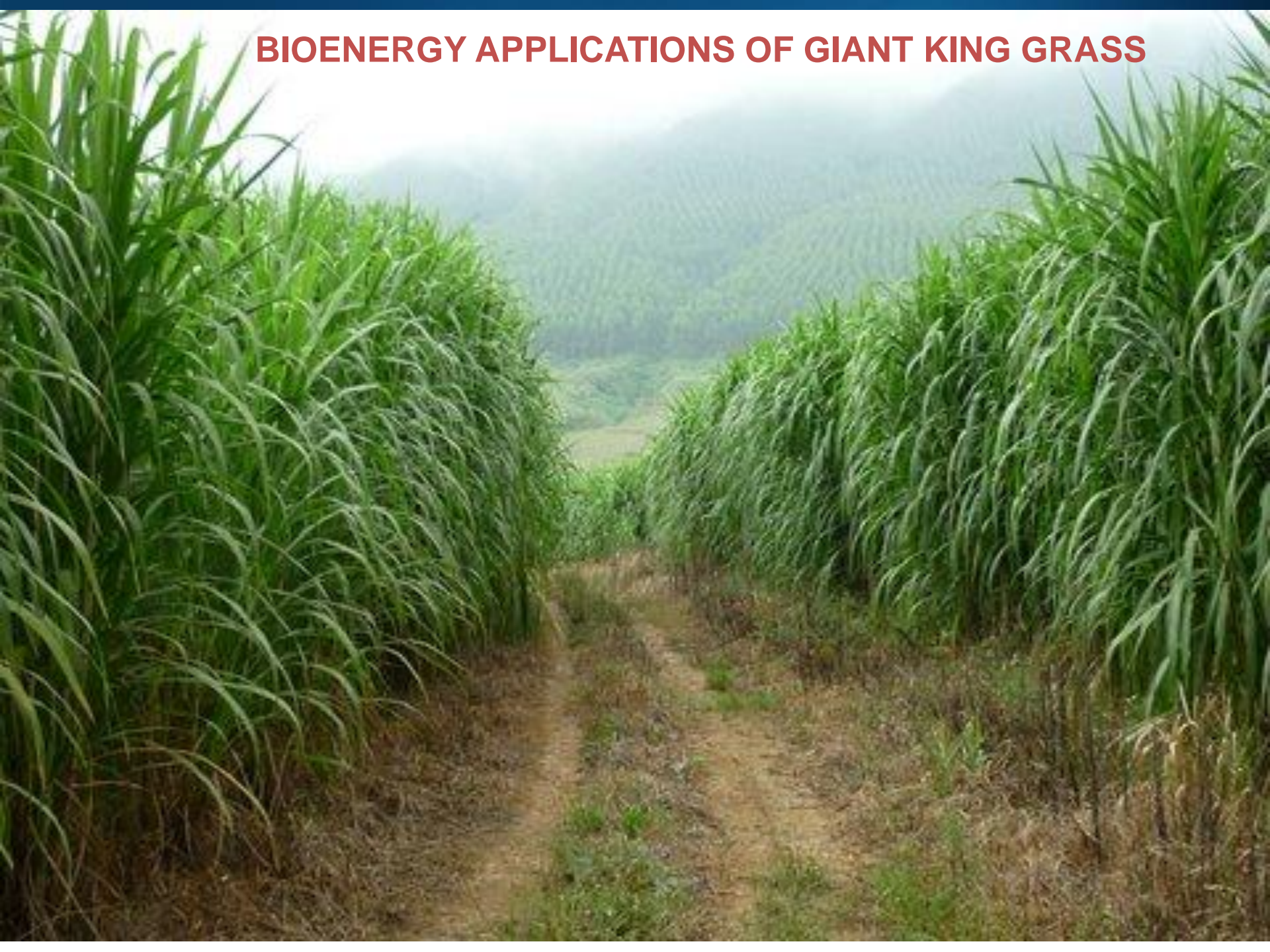
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- New processes at the biorefinery allow the use of wet biomass eliminating the need for drying. Eliminates this expensive step
- Allows “direct from field to biorefinery”
- Growing your own feedstock gives complete control and bankable feedstock security



- Potential products from cellulose
 - Ethanol, butanol
 - Lactic acid > polylactic acid > bioplastics
 - Pulp > Paper, viscose textile fibers
- Potential products from hemicellulose
 - Ethanol, butanol
 - chemicals such as furfural and acetic acid
- Lignin for combustion, fiber strengthener for structural plastics, adhesives and epoxy resins
- Wastewater for biogas and organic fertilizer
- Material recovery from liquids

BIOENERGY APPLICATIONS OF GIANT KING GRASS



Giant King Grass & Biomass Power / Steam Plant

- Giant King Grass has excellent energy content of 18.4 MJ (megajoule) per dry kilogram HHV equivalent to 4400 kcal/kg, 7900 btu/lb
- Burn in a power plant instead of coal or oil
- Giant King Grass properties similar to corn & wheat straw
- 30 MW power plant requires 1600 ha of Giant King Grass



Giant King Grass Energy Analysis



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Proximate Analysis	Unit	Sun Dried As Received	Giant King Grass Bone Dry
Total Moisture	%	14	0
Volatile Matter	%	65.68	76.37
Ash	%	3.59	4.17
Fixed Carbon	%	16.74	19.46
Total Sulfur	%	0.11	0.13
HHV	MJ/Kg	15.85	18.43
LHV	MJ/Kg	14.52	-

Giant King Grass Pellets as Coal Replacement



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- Giant King Grass pellets co-fired up to 20% w/ coal
 - Requires small modification to existing coal power plant
 - Dry & press into pellets
- Preserves existing power plant investment & meets carbon reduction targets
- Large global demand
 - Particularly in Europe
 - Korea, China, Japan emerging
- Dedicated energy crops favored over waste



Why Giant King Grass?



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- Dedicated energy crop, sustainably grown
- Can be harvested 6 ½ months after planting and every 5 months thereafter
- Very high yield means lowest cost
 - Generally lower cost than agricultural waste such as corn straw
- Single cultivar means consistent quality
- Can harvest all year long in tropical area
- Simple logistics if biorefinery is co-located with plantation

- Giant King Grass is the lowest cost cellulosic feedstock for a biorefinery
- Co-location of biorefinery with Giant King Grass plantation greatly simplifies logistics
 - Sugar-based biorefineries are co-locating to Brazil to reduce costs
- New approaches of just-in-time harvesting and using wet biomass further reduce costs
- Giant King Grass can also fuel boilers to produce process heat, steam & electricity

- VIASPACE is prepared to partner with biorefinery projects in the southern US, Hawaii, Puerto Rico, American Samoa, Caribbean, Central and South America, Southeast Asia, China, India and Africa
- Sample quantities are available for testing

Thank You



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Dr. Carl Kukkonen

CEO Biography



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1998-PRESENT VIASPACE Inc. CEO

1984-1998 NASA/Caltech Jet Propulsion Laboratory (JPL)

**Director Center for Space
Microelectronics Technology**

Manager of Supercomputing

- Led staff of 250 with \$70 million annual budget
- On review boards of 14 leading universities
- NASA Exceptional Achievement Award 1992
- Space Technology Hall of Fame 2001

1977-1984 Ford Motor Company

- Developed direct injection diesel engine
- Ford's expert on hydrogen as an automotive fuel
- Research in Physics Department

1975-1977 Purdue University postdoctoral fellow

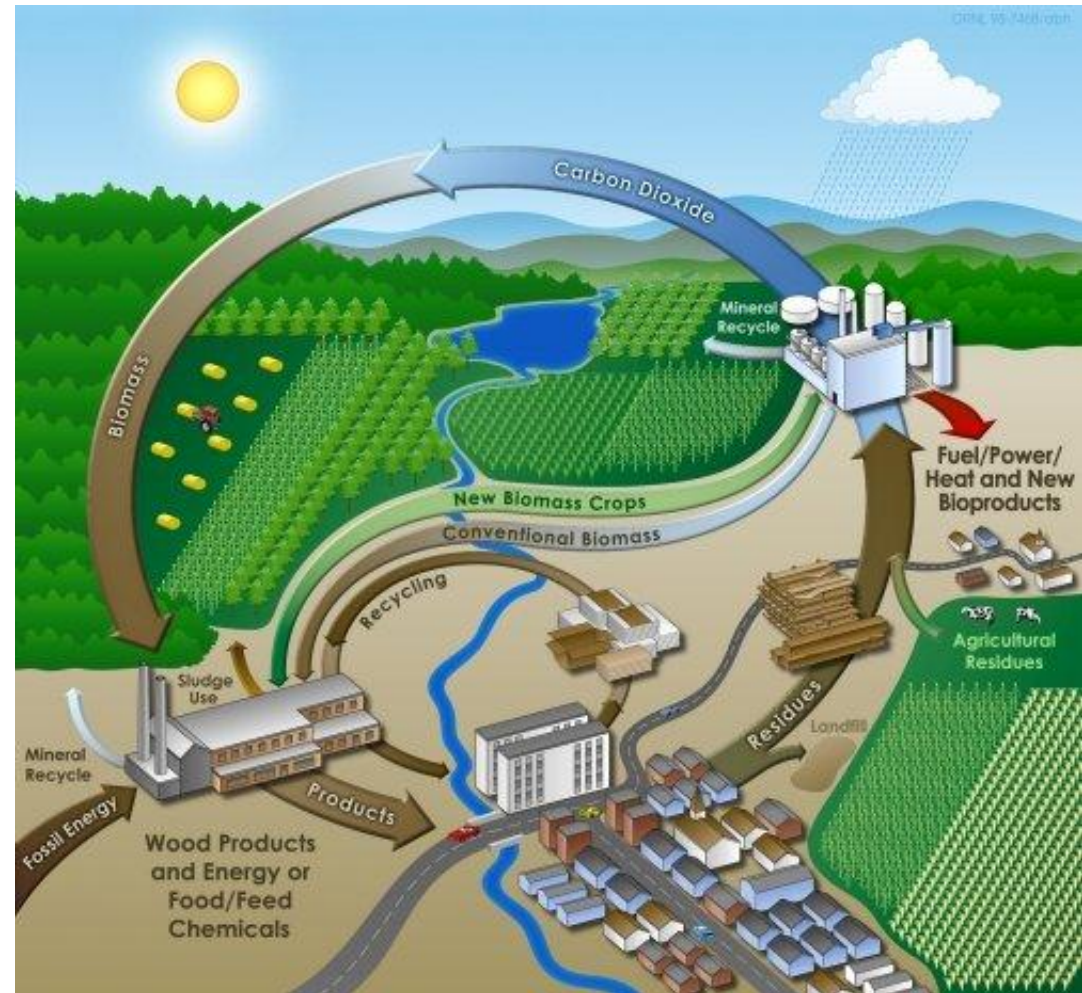
1968-1975 Cornell University MS & PhD in theoretical physics

1966-1968 University of California Davis BS physics



Biomass is Low Carbon

- Biomass energy is solar energy & CO₂ captured in plants by photosynthesis
- Burning biomass or biofuels simply recycles the CO₂ stored by the plant
- Carbon neutral except
 - Fertilizer, harvesting, & delivery contribute some carbon dioxide



How Cellulosic Ethanol is Made



Sugar Data & Projected Ethanol Yield (L/tonne)

