Update on 12 MW Giant King® Grass Biomass Power Plant in Nicaragua

VIASPACE Clean Energy for a Cleaner Tomorrow

Giant King Grass Dedicated Energy Crop

Example: Turbine and Generator in Biomass Power Plant

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INTERNATIONAL BIOMASS CONFERENCE & EXPO
a BBI International event

April 20-22, 2015
Minneapolis Convention Center
Minneapolis, MN

- VIASPACE is a publicly traded company
  - Fully reporting to SEC and audited
  - VIASPACE stock symbol VSPC
- Giant King® is a registered trademark
- Giant King® Grass is proprietary to VIASPACE

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Dr. Carl Kukkonen
CEO Biography

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1998-PRESENT VIASPACE Inc. CEO—Originally products came "VIA" the "SPACE" program VIASPACE now focuses on renewable energy and animal feed using its proprietary Giant King Grass

1984-1998 NASA/Caltech Jet Propulsion Laboratory (JPL) Director, Center for Space Microelectronics Technology and 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 Renewable & Low Carbon

Plants Breathe Carbon Dioxide

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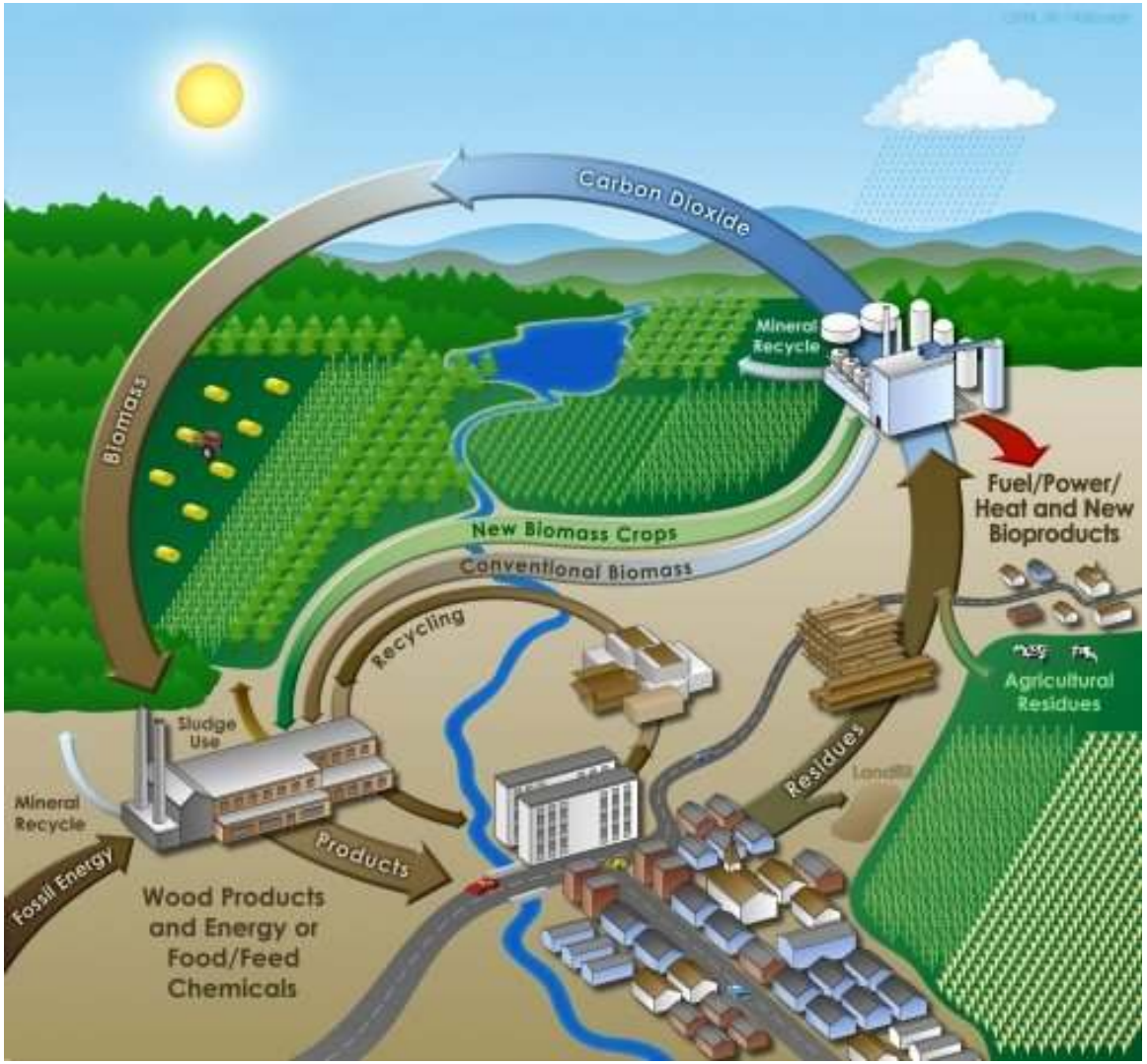
- Plants use sunlight & CO_2 to grow. Carbon is stored in the plant
- Burning biomass or biofuels simply recycles the CO_2 stored in the plant
  - Time can be 6 months - grass to 20 years-trees
- Biomass is carbon neutral except from
  - Fertilizer, harvesting, & delivery



Sources of Biomass for Energy

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- Wood and wood waste
  - Best fuel, but limited availability and there are many other uses in addition to construction and furniture that have higher value
    - Pulp and paper
    - Particle board (MDF)
- Sugarcane bagasse is already used by sugar mills to produce heat and electricity
  - Only available for 6-9 month crushing season
- Agricultural residues such as corn, wheat or rice straw and rice husk
  - Seasonal availability with uncertain pricing, and no long term contracts available
- Dedicated energy crops such as fast growing trees and perennial grasses
- Giant King Grass has highest yield by far which means lowest cost

Biomass Power Plant Financing

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- First question from banker for biomass power plant is “show me your fuel supply agreement.”
  - We are “**growing our own electricity**”
- Power Purchase Agreement (PPA) from a creditworthy counterparty
- Proven technology
- Qualified EPC contractor that will guarantee cost, schedule and performance
- Management/operations team

Mature 6 month old Giant King Grass ready to harvest

Giant King® Grass

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- High yield dedicated energy crop (175 acres/MW)
- Harvested twice a year at 15+ feet tall
- Perennial crop, cut and regrow for 7 – 10 years
- A natural proprietary hybrid, not genetically modified
- Propagated vegetatively like sugarcane
- Will grow on marginal land
- Tropical and subtropical grass
  - Will survive a frost, but not freezing weather
- Need sufficient rainfall or irrigation
- Provides reliable, low cost fuel or feedstock for 24/7 operations 365 days/year

Giant King Grass
Very High Yield

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- Growing in
  - US—California, Hawaii
  - St. Croix, US Virgin Islands
  - Nicaragua
  - Myanmar
  - South Africa
  - China
  - Pakistan
  - Guyana
  - Jamaica
  - Philippines

Nicaragua Project Overview

Nicaragua

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- Largest country in Central America (in area)
- Large agriculture sector
- 5M people
- Safest country in region
- Poorest country in region
- Tropical climate
  - Rainy & dry seasons
- Bunker oil provides base load for the electrical generation and about 50% of energy
  - Other 50%: hydro, wind, biomass and geothermal

Nicaragua

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- Needs more electricity
- Policy is 97% renewables by 2030
  - Will use any renewable with lower cost than oil
  - Current low oil prices make renewables more expensive
- But hydro is seasonal and wind intermittent
  - Grid cannot handle any more intermittent electricity
- 7 year tax break & no import duty on renewable equipment
- Nicaragua has low labor costs and industry wants to move there
  - But needs competitive and reliable electricity
- Can sell electricity to grid and private industry delivered by grid

AGRICORP is Partner

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- Agro-industrial company in Nicaragua
- Mills, distributes and grows rice
- Has more than 50% of the rice market in Nicaragua
- Giant King Grass growing well on AGRICORP plantation since 2012
- AGRICORP investors and VIASPACE have formed a special purpose company for the 12 MW power plant and Giant King Grass plantation
  - In development—not built
- "Energia Reino Verde"—Green Kingdom Energy

Tropical Weather in Nicaragua is Suitable for Giant King Grass

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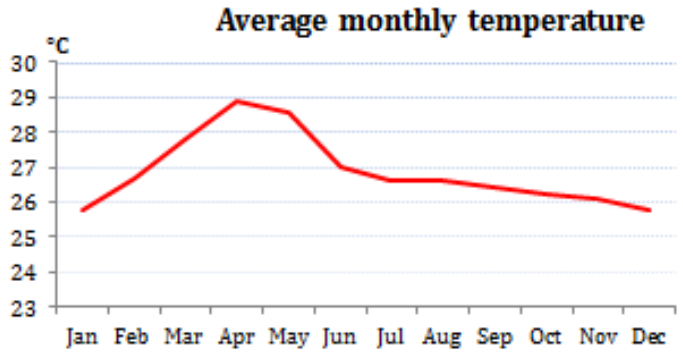

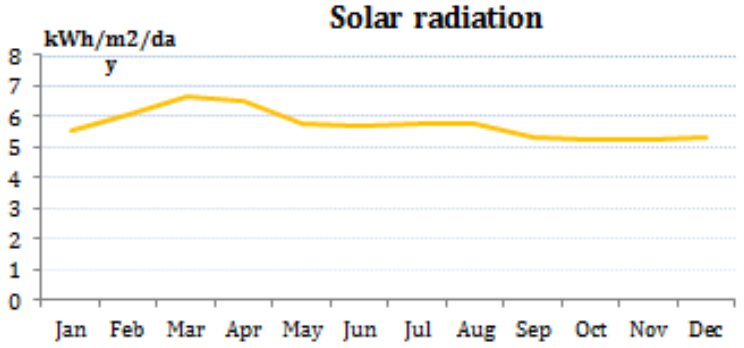

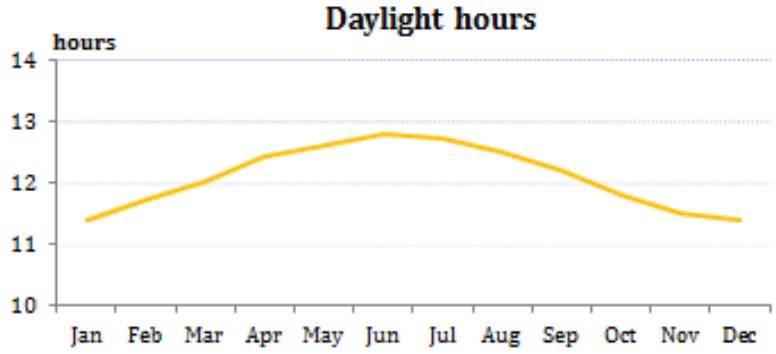

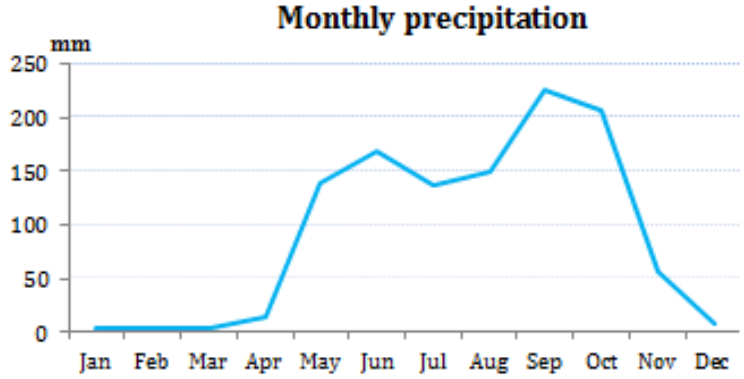

Irrigation used during dry season

With sufficient rainfall or irrigation, Giant King Grass can be harvested twice per year

Nicaragua Project Overview

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- 12 MW gross power
- High-temperature high-pressure boiler with 30% efficiency from heating value of fuel to electricity
  - Special boiler design compatible with corrosive fuels with low melting temperature ash
  - Same problems as with corn straw, wheat straw, rice straw or other grasses.
- High availability minimum 90%--7884 hours
- 11% internal electricity use
- 84 million kwh of salable electricity
- Lifetime 25+ years
- Fuel consumption--9 dry equivalent metric tons of Giant King Grass per hour
- Power plant co-located with 2100 acre (832 hectare) Giant King Grass plantation

Nicaragua Project Status

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- ✓ Prefeasibility study and business plan
- ✓ Giant King Grass growing well in Nicaragua
- ✓ Formal feasibility study completed
- ✓ EPC contractor selected and contract signed
- ✓ Power plant operator selected
- ✓ Provisional Generation License applied for
- ✓ Non-objection letter from community
- ✓ Non-objection letter from environmental department
- ✓ Letters of intent from debt financers--banks
- ✓ Local partners will provide half of the equity
- Power Purchase Agreement
- Environmental impact study
- Grid Interruption Study
- Generation license
- Financial close
- Operational 24 months after financial close

Visited Biomass Power Plants Under Construction

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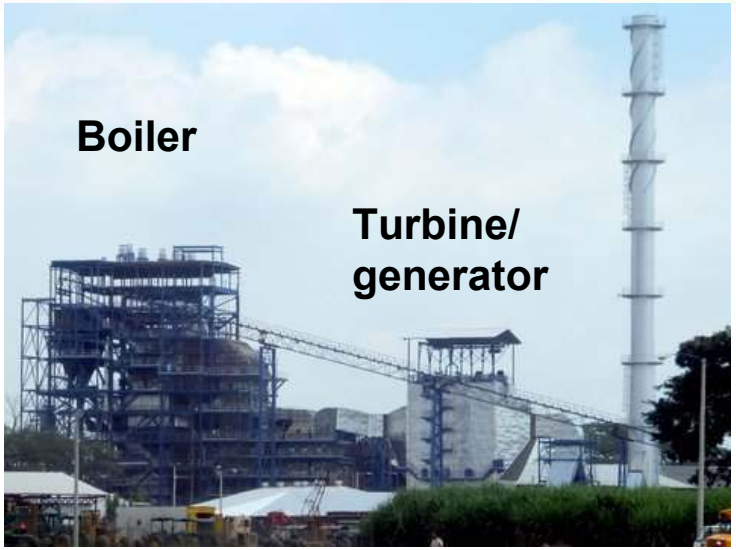

Turbine and generator

Turbine/generator building with control room

Visited Operating Biomass Power Plants

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Due diligence team

Fuel feed to boiler

Operating boiler

Visited Operating Biomass Power Plants

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Cooling tower

Control room

Turbine/generator

Feasibility Study Summary and Conclusions

- **The proposed integrated Energía Reino Verde 12 MW biomass power plant and 925 ha Giant King Grass plantation project is technically feasible and financeable**
- Validated costs and financial projections for the project
- Strong support team for the project including
  - Agricorp-one of the largest companies in Nicaragua
    - annual revenues exceeding $150 million
  - IC Power (2nd largest IPP in Nicaragua)
  - Pro Nicaragua, the government investment promotion agency.
- Giant King Grass plantation is very similar to a sugarcane plantation
  - Will utilize best practices from the sugarcane industry.

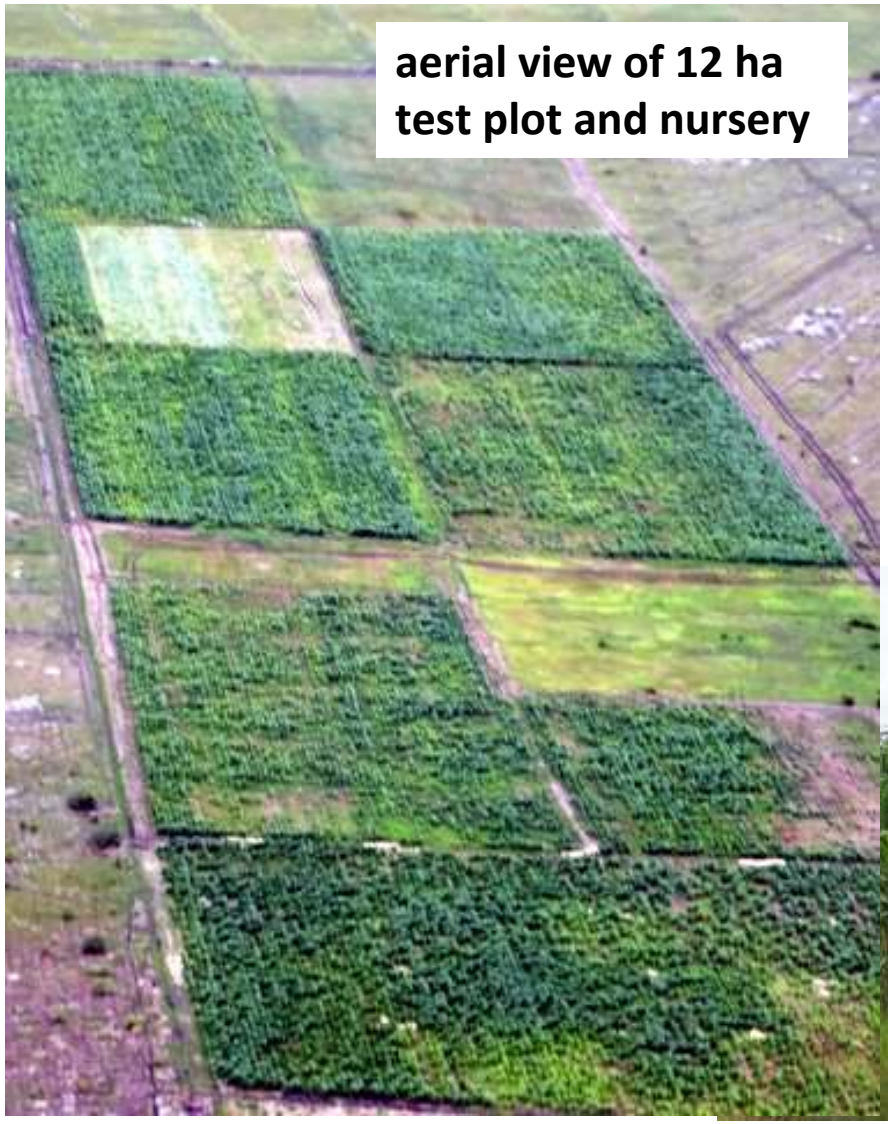
Feasibility Study Summary and Conclusions

- **The Giant King Grass plantation will be located on the 4,200 ha (10,387 acre) Miramontes plantation that is currently growing rice on 2,800 ha.**
  - Irrigation from Lake Nicaragua is available
  - Plantation and power plant workers available in the region.
- In addition to Giant King Grass, the power plant will be fueled by rice husk as a secondary fuel (5-8%)
- Rice straw from the plantation is available as a backup fuel

Aerial view of rice plantation

Rice husk residue from milling

Giant King Grass Growing Well at Miramontes



aerial view of 12 ha test plot and nursery

two agronomists assigned to Giant King Grass

VIASPACE CEO Dr. Carl Kukkonen

AGRICORP Has Infrastructure and Experience

Irrigation available

Farm equipment and knowhow

Feasibility Study Summary and Conclusions

- Co-location of power plant and plantation is a major advantage
- Average distance of field to power plant is 3 km
- Reduces transport costs
- Simplifies logistics

Power Plant Operations

- An experienced team will operate the power plant.
- A candidate operator is IC Power Nicaragua
  - Large independent power producer in Nicaragua with 185 MW installed from bunker oil and wind
  - Previous experience in sugarcane bagasse power plant

51 MW bunker oil power plant

63 MW of wind power

Feasibility Study Summary and Conclusions

- The biomass power plant is located 9 km from a grid connection point
  - Reasonable expense for the proposed size of the project.

Surveyed route shown in red

Nicaragua Power Plant Costs

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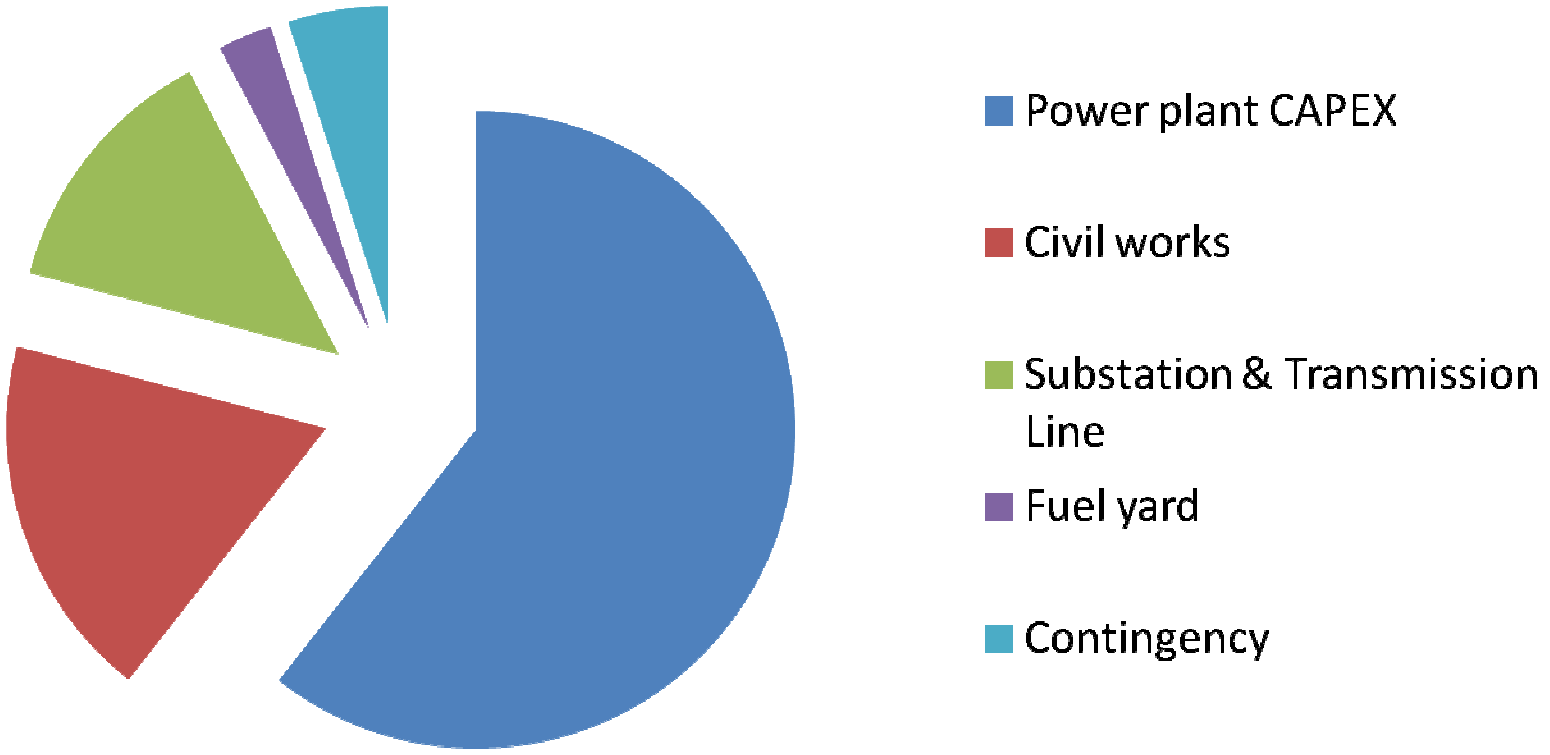

Overall Nicaragua Project Costs

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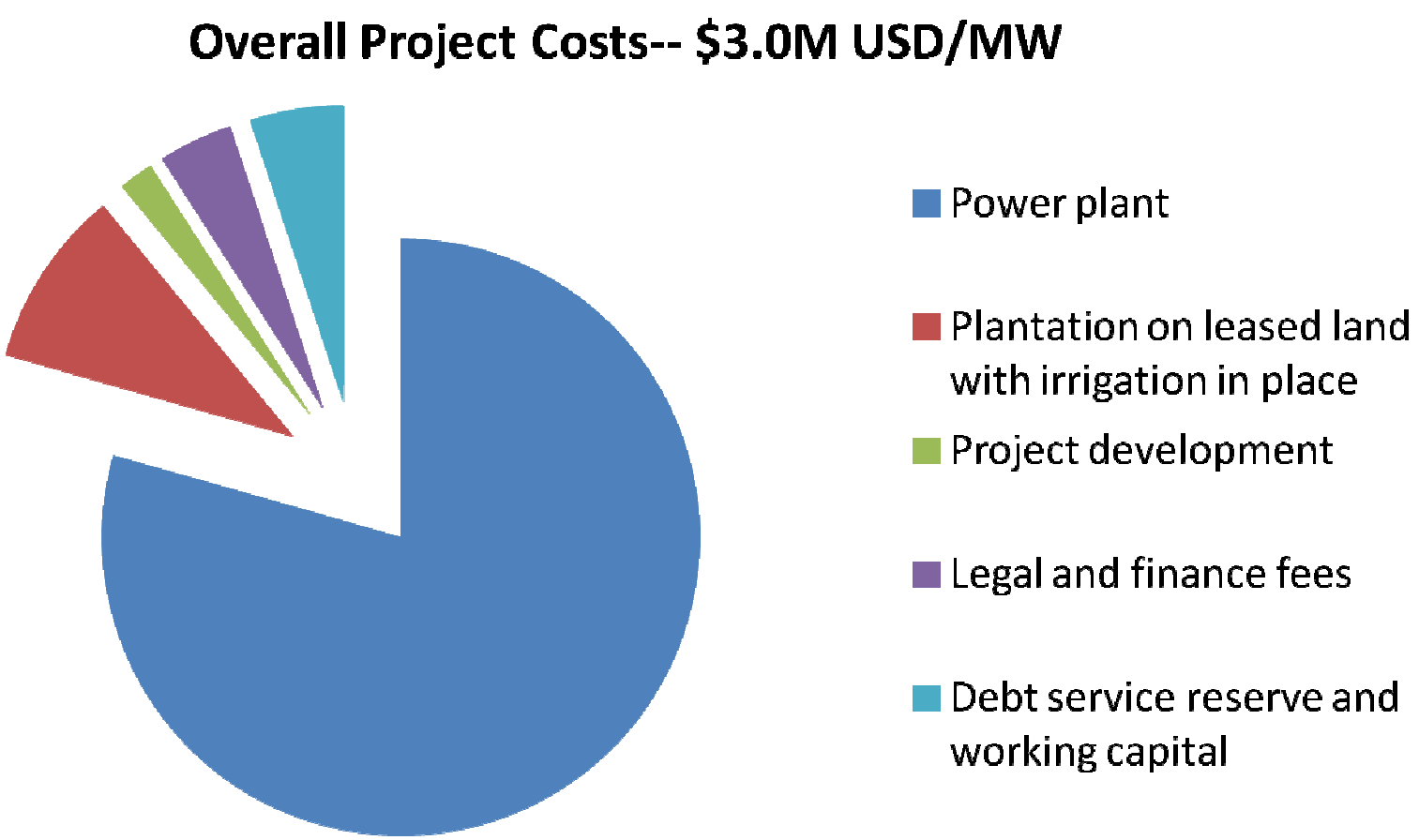

Electricity Cost

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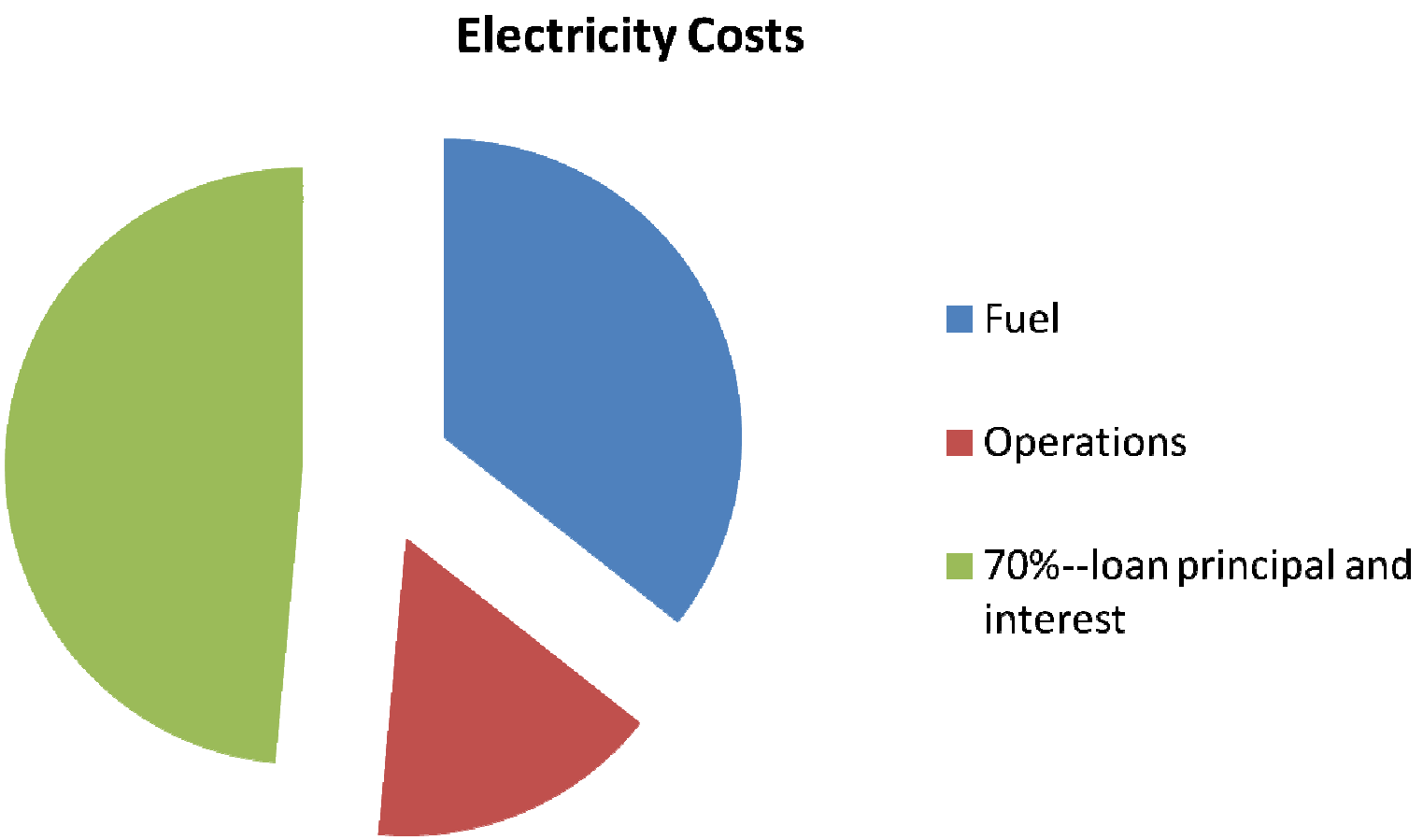

Add profit to get sales price

12 MW Giant King Grass Power Plant in Nicaragua

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- Provides renewable, low carbon, base electricity
  - Reliable 24 hours/day
  - Not intermittent like wind and solar
  - Complements hydro
- Lower cost than heavy fuel oil at ~$60/barrel oil
  - Lower cost than diesel
- Plantation and power plant provide jobs
  - Construction employment
  - Ongoing rural employment—skilled and farmworkers
- Pays municipal and national taxes
- Electricity infrastructure for people and industry
- Utilizes the natural resources of Nicaragua– sunshine, warm weather and water
- Sustainable agriculture
- Money stays in Nicaragua rather than sending money overseas for oil

Giant King Grass Applications

Generate Electricity from Biomass

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- Direct combustion
  - Burn 100% biomass in power plant for zero carbon emissions
  - Co-fire with coal to reduce carbon emissions
- Proven technology
- Harvest Giant King Grass twice per year at 15 – 18 feet tall
  - Dry and chop for local power plant
  - Make pellets for export
- Reliable 24/7 base electricity

Generate Electricity from Biomass

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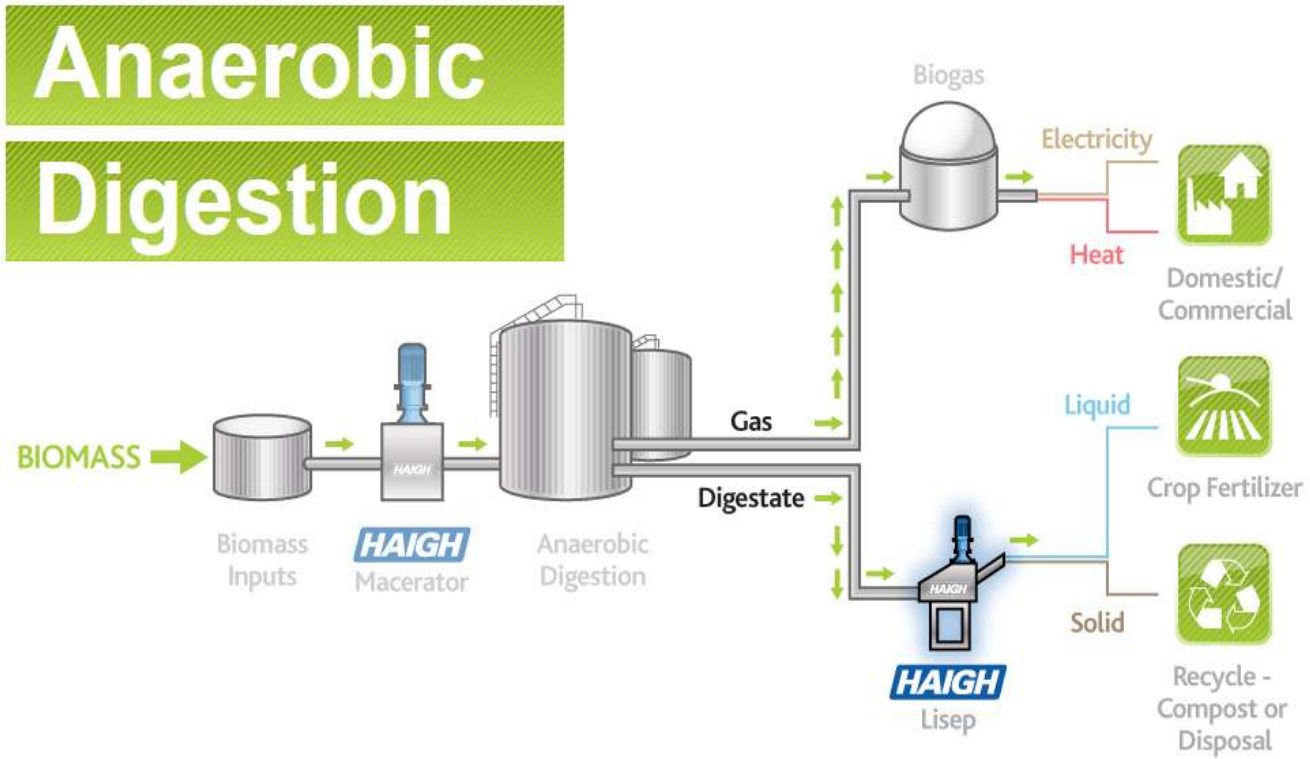
- Anaerobic digestion
  - Biological process that mimics a cow stomach to make bio methane (biogas)
  - Organic fertilizer is a byproduct
- Biogas is used in engine which turns a generator
- Reliable 24/7 base electricity
  - 10,000 operational in Europe
- Giant King Grass is harvested 4-5 times per year at 8-12 feet tall
- Chop only, drying not necessary
  - Can be stored as silage
- Co-digestion with other organic matter such as manure or food processing waste



Biogas is 57% methane and 43% carbon dioxide and fuels an engine that turns a generator to make electricity

Giant King Grass Pellets as Coal Replacement

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- Giant King Grass pellets can replace up to 20% of coal in an existing coal-fired power plant
  - Burning coal and biomass together is called cofiring
  - Requires small modification
- Preserves large capital investment in existing power plant with 30 year additional life
- Meets carbon reduction targets
- 16M tons of pellets used globally today
  - 46M tons by 2020
- Grass is grown, dried and pressed into pellets and shipped in bulk like shipping grain
- Large global demand
  - Particularly in Europe
  - Korea, China, Japan emerging

Test Data on Giant King Grass Shows Consistency of Product

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Composition Determination

Parameter	Amount (a.r.)	Amount (o.d.)
Total Moisture	8,81	
Moisture Airdry		
Ash	4,66	5,11
Volatile matter incl. moisture.		
Volatile matter	70,34	77,14
Fixed Carbon	16,18	17,75
Gross Calorific Value	4055,2	4446,9
	16,978	18,618
Nett Calorific Value (cV)	3742,1	
	15,667	
	6735,7	
Nett Calorific Value (cP)	15,592	

TLR international laboratories

国家煤炭质量监督检验中心
China National Coal Quality Supervision and Testing Center

SGS

GKG is Good Feed for Dairy Cows, Cattle, Camels, Goats, Sheep & Horses

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Cut at 5-7 ft tall at 45-60 days

Cut & carry, or potentially Intensive grazing

Fresh, silage, hay, Meal or pellets

Part of diet for pigs, rabbits & fish

Giant King Grass Nutrition

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- Excellent nutrition--ideal for ruminants-cattle, sheep, goats & camels
- Also for horses, pigs, rabbits and some fish
- Better than oat hay
- High yield means low cost
- Reduces need for expensive alfalfa, grains and concentrates in a mixed ration feed
- Can be used as fresh chop, silage, hay, meal or pellets

Dairy One

GIANT KING GRASS HOLTVILLE ROW 3

Analysis Results

Components	As Fed	DM
% Moisture	82.8	
% Dry Matter	17.2	
% Crude Protein	3.0	17.3
% Available Protein	2.8	16.4
% ADICP	.2	.9
% Adjusted Crude Protein	3.0	17.3
Soluble Protein % CP		45
Degradable Protein%CP		75
% NDICP	.6	3.7
% Acid Detergent Fiber	6.6	38.5
% Neutral Detergent Fiber	10.5	60.9
% Lignin	.6	3.6
% NFC	1.2	7.2
% Starch	<0.1	.2
% WSC (Water Sol. Carbs.)	1.8	10.5
% ESC (Simple Sugars)	1.5	8.7
% Crude Fat	.4	2.1
% Ash	2.15	12.53
% TDN	11	61
NEL, Mcal/Lb	.09	.55
NEM, Mcal/Lb	.10	.56
NEG, Mcal/Lb	.05	.31
Relative Feed Value		90

Giant King Grass Can Be Used As Feedstock for Biofuels, Biochemicals and Biomaterials

Giant King Grass is the Same as Corn Stover w/ Much Higher Yield

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Composition Dry Weight %	Giant King Grass	Corn Stover
Glucan	43.0	37.4
Xylan	22.3	21.1
Arabinan	2.9	2.9
Lignin	17.4	18.0
Ash	4.5	5.2

Notes and references:
Giant King Grass: average of samples cut at 4 m tall
Corn Stover: Aden et al. NREL/TP-510-32438, 2002

Composition- Glucan Xylan & Arabinan are sugars for cellulosic ethanol. Lignin & ash are byproducts

One dry ton of Giant King Grass is slightly better than corn Stover for cellulosic ethanol

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

Giant King Grass has much higher yield per acre than corn

High Yield of Giant King Grass Means High Ethanol Production

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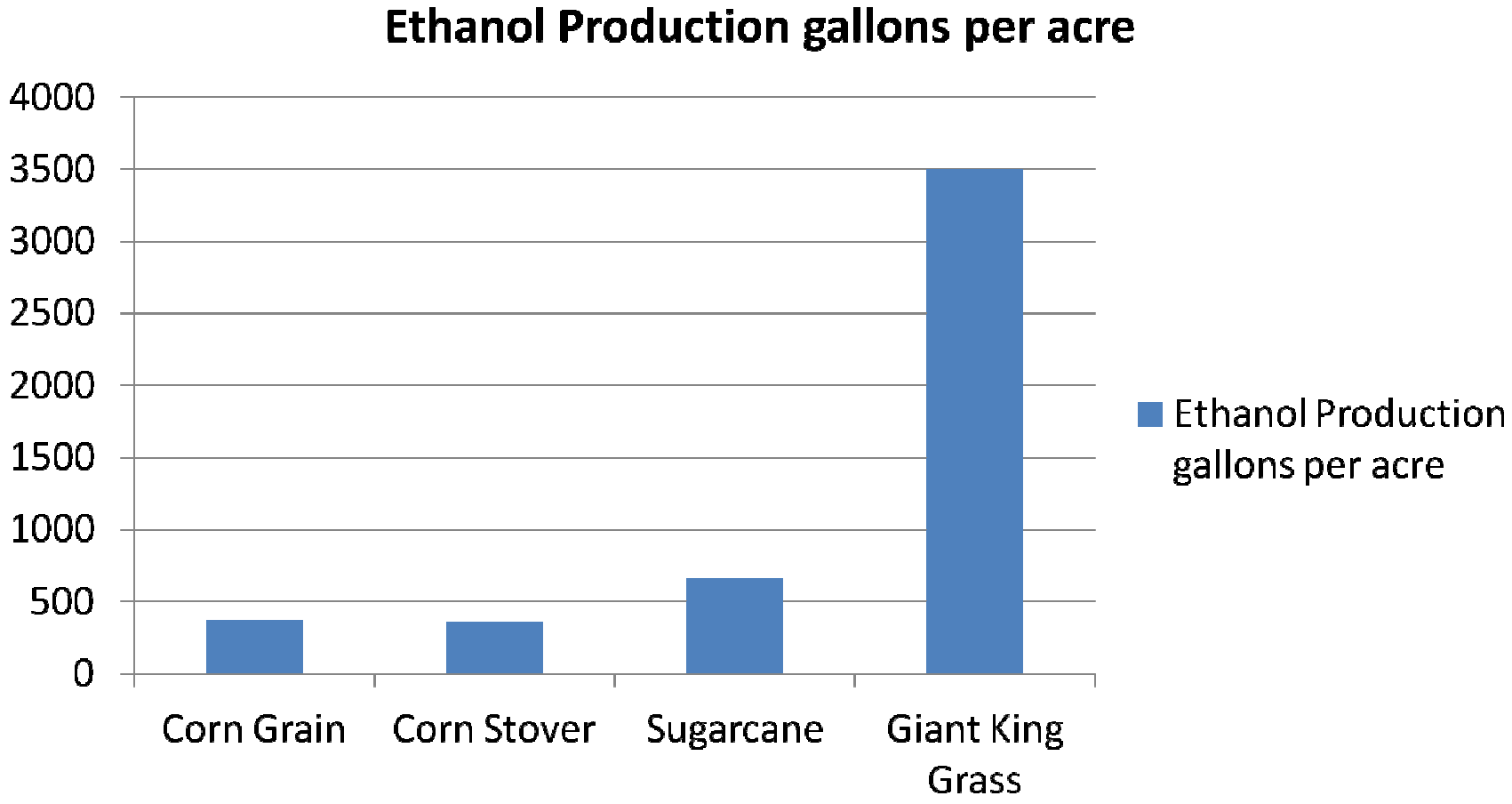

Advantages of Giant King® Grass

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- "Platform" energy crop for many bioenergy applications
  - Electricity, pellets, biofuels, biochemicals & bio plastics
- Excellent animal feed with high protein
- Lowest cost--Can meet cost targets for energy & biofuels applications because of high yield of Giant King Grass
  - Less expensive than agricultural waste
- Perennial crop
  - Do not have to plant every year, just harvest
  - Short rotation—first harvested in 6.5 months
- Provides reliable, well documented, consistent quality fuel or feedstock with predictable, affordable price
  - Fuel supply reliability required for project financing

Thank You

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