ABENGOA BIOENERGY

Abengoa Bioenergy Hybrid of Kansas, LLC (ABHK)

www.abengoabioenergy.com

Abengoa Overview

Abengoa is a technology company that applies innovative solutions for sustainable development in infrastructure, environmental and energy sectors. It is present in over 70 countries where it operates through its five Business Units: Solar, Bioenergy, Environmental Services, Information Technology, and Industrial Engineering and Construction.

Industrial Engineering & Construction

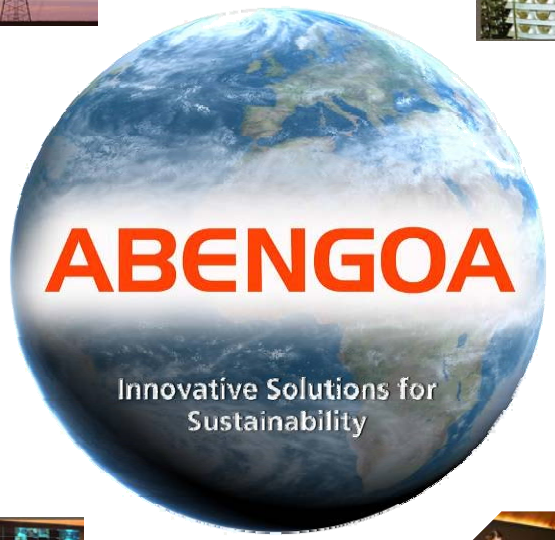
With engineering…
we build and operate conventional and renewable energy power plants, power transmission systems, and industrial infrastructures

Environmental Services

With waste …
we produce new materials through recycling, and we treat and desalinate water

Bioenergy

With biomass …
we produce ecological biofuels and animal feed



Solar

With the sun …
we produce thermoelectric and photovoltaic electric energy

Information Technology

With information technologies …
we manage business and operational processes in a secure and efficient way

Focus-Abengoa Foundation

With social and cultural policies …
we contribute to economic progress and the conservation of the environment in communities where Abengoa is present

Science. Solutions. Service.

Assets for R&D Strategy Development

…and Leading the 2nd Generation

Commercial Hybrid Biomass Plant Hugoton (KS, US)

- Capacity : 16 MGPY Cellulosic Ethanol, 70 MW Renewable Power
- Raw material : Corn Stove, Wheat Straw, Switchgrass
- Technology : Enzymatic Hydrolysis (glucose & xylose)
- Objective : Production at a gasoline competitive cost
- Start-up Operations : 2012 estimated

Biomass Demonstration Plant in BCL (Salamanca, Spain)

- Capacity : 1.3 MGPY
- Raw material : Wheat and Barley Straw
- Technology : Enzymatic Hydrolysis (glucose)
- Objective : Demonstrate biomass -to-ethanol process technology at commercial scale
- Start-up Operations : 2009

Biomass Pilot Plant in York (NE, US)

- Capacity : 0.02 MGPY
- Raw material : Corn stover
- Technology : Enzymatic Hydrolysis (glucose & xylose)
- Objective : Competitive process with grain ethanol
- Start-up Oper. : 2008

Facility Aerial view

Biomass plant areas

- Feedstock Preparation
- Pre-treatment
- Enzymatic hydrolysis and fermentation
- Distillation
- Utilities

Preparation

- Bale storage area
- Milling & cleaning

Pretreatment

- Acid impregnation
- Steam explosion
- Neutralization

Enzymatic Hydrolysis and Fermentation

- Enzyme addition
- Pre-Saccharification
- Yeast addition
- Fermentation

Distillation

- Ethanol 42%w
- Stillage

Utilities

- Chilled water
- High pressure boilers
- Anaerobic waste water treatment plant
- Compressed air

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Abengoa Bioenergy Hybrid of Kansas (ABHK)

- First commercial facility of Abengoa Bioenergy's Cellulosic Ethanol technology
- A $450 million plus project, supported by a $76 million grant from the Department of Energy plus an equity commitment from Abengoa Bioenergy
- Proposed project start of construction, 1st Half of 2010, start of operation by beginning of 2012
- Hugoton Kansas site selected for project based on local attributes:
  - Significant supply of biomass
  - Strong state and local support for the project
- Key first project in the successful growth of Abengoa's Cellulosic Ethanol Business and the Nation's Cellulosic Ethanol Industry

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Projected Local Economic Impact

- 40 – 45 Full Time well paying jobs at the facility.
- 50 – 100 jobs in biomass procurement.
- 88 equivalent full time jobs during construction (18 months)
- $17M in added local income during construction, $4.5M after operation commences.
- $3-5M spent locally in materials and services.
- $9M for biomass feedstock from local producers, not including harvest or transport.
- The project will generate significant additional tax revenue at all levels, local, state, and federal.

ABHK Operation

Biomass Feedstock
2,500 Wet Tons per day
875,000 Wet Tons per year
Corn Stove, Wheat Straw,
Switch Grass

Enzymatic Hydrolysis Plant

Electricity and Steam

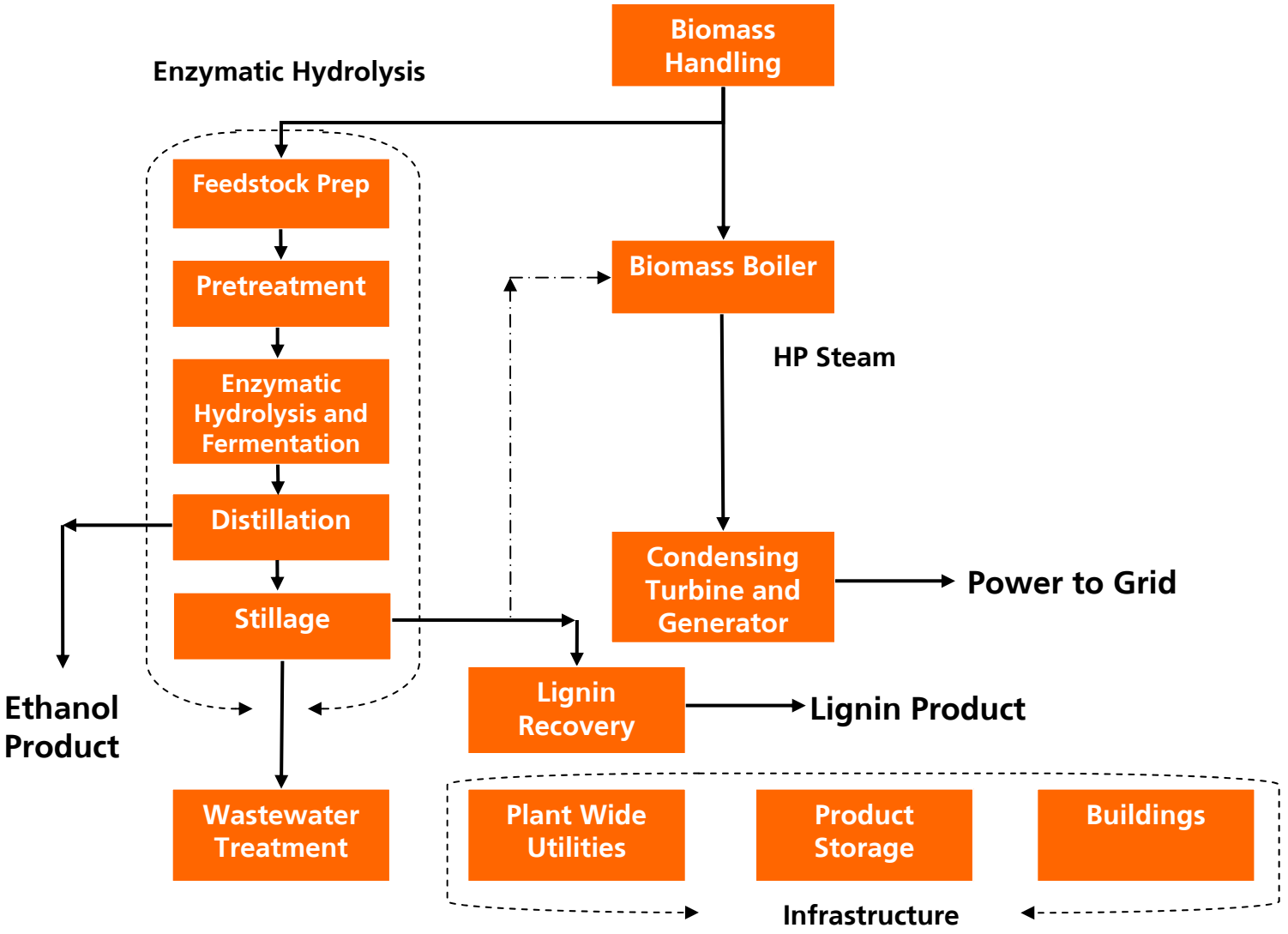
Energy Plant

Renewable Electricity
70 MW

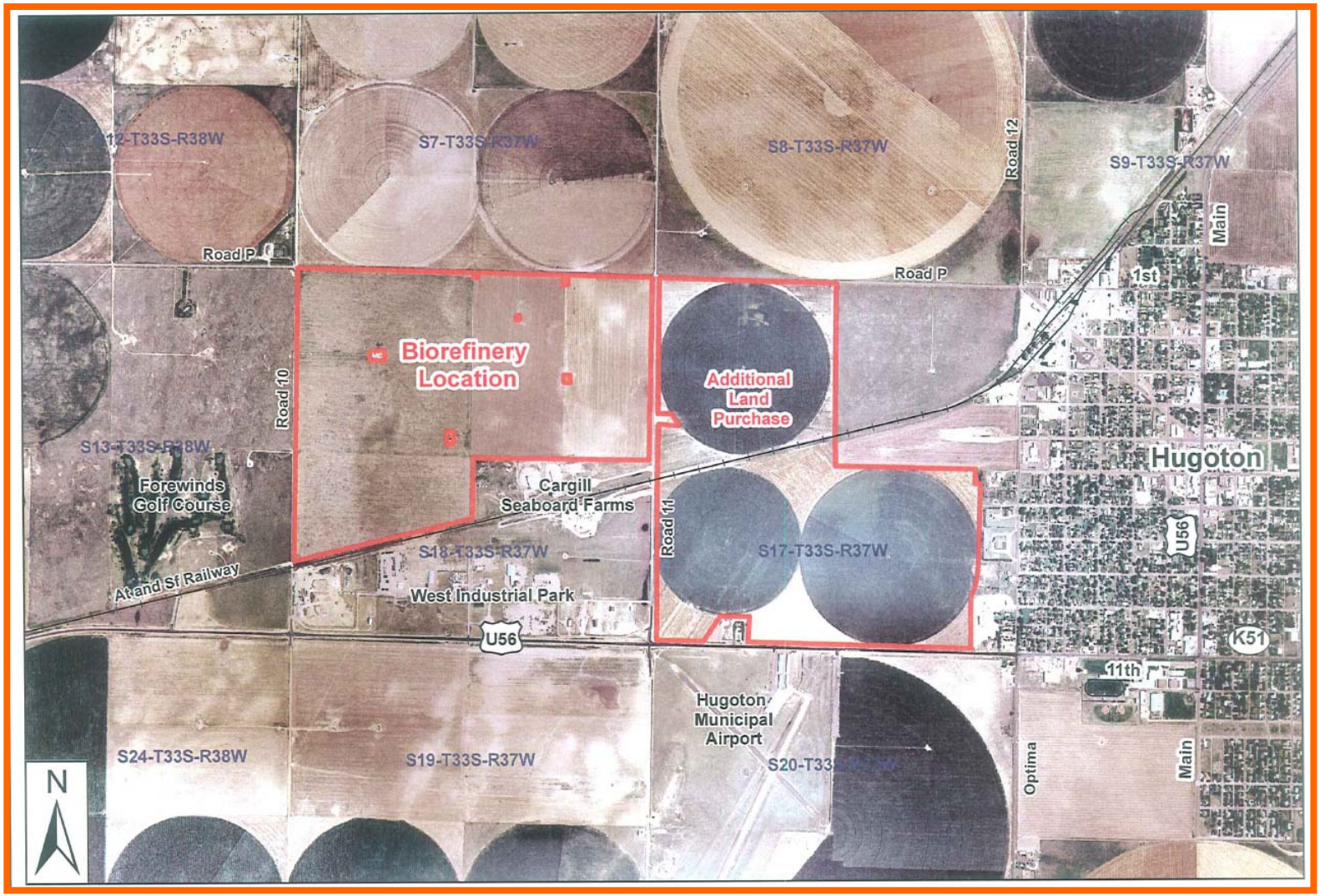
Cellulosic Ethanol
16 M gallon / year

Lignin
29 K Ton / year

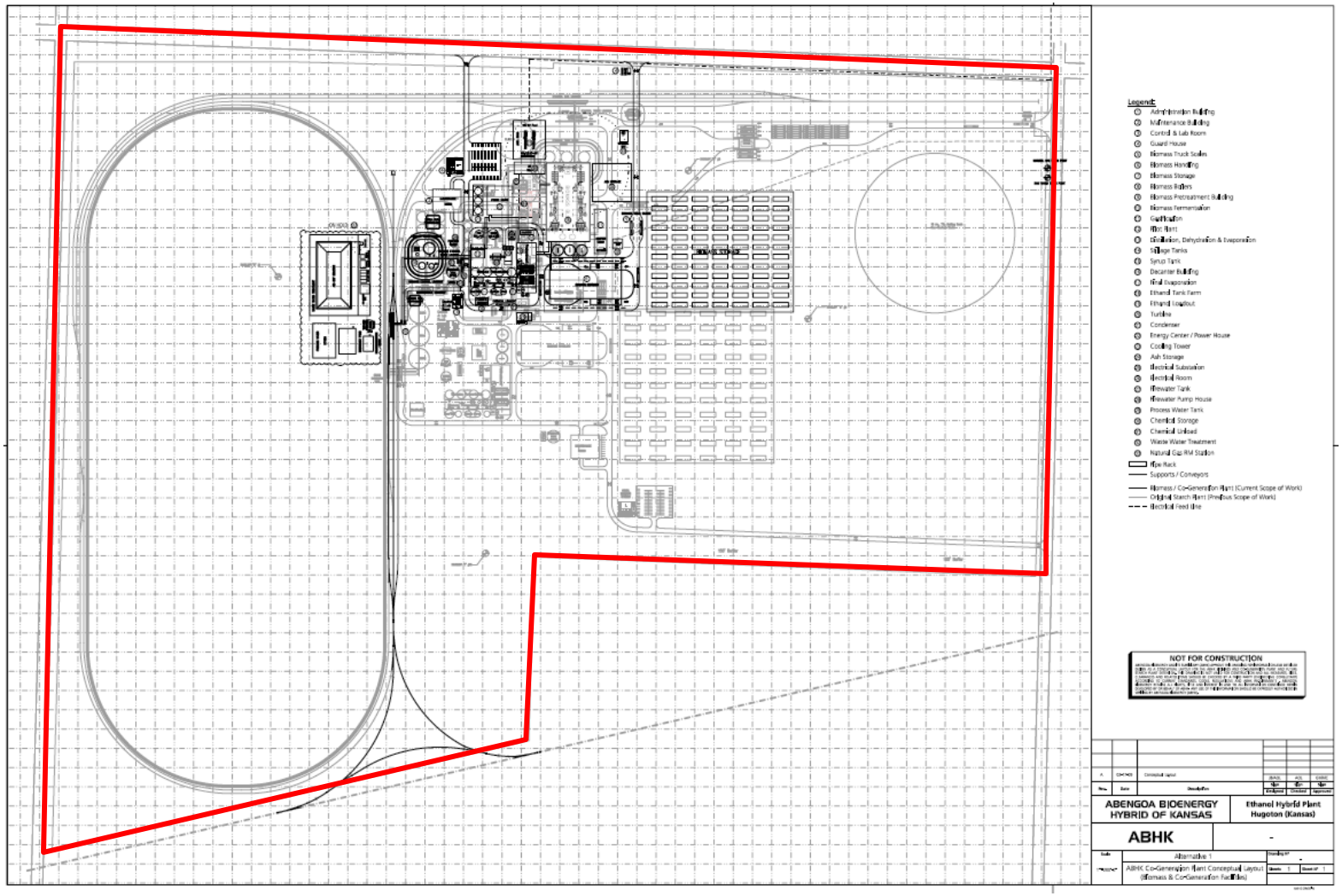
ABHK Block Flow Diagram



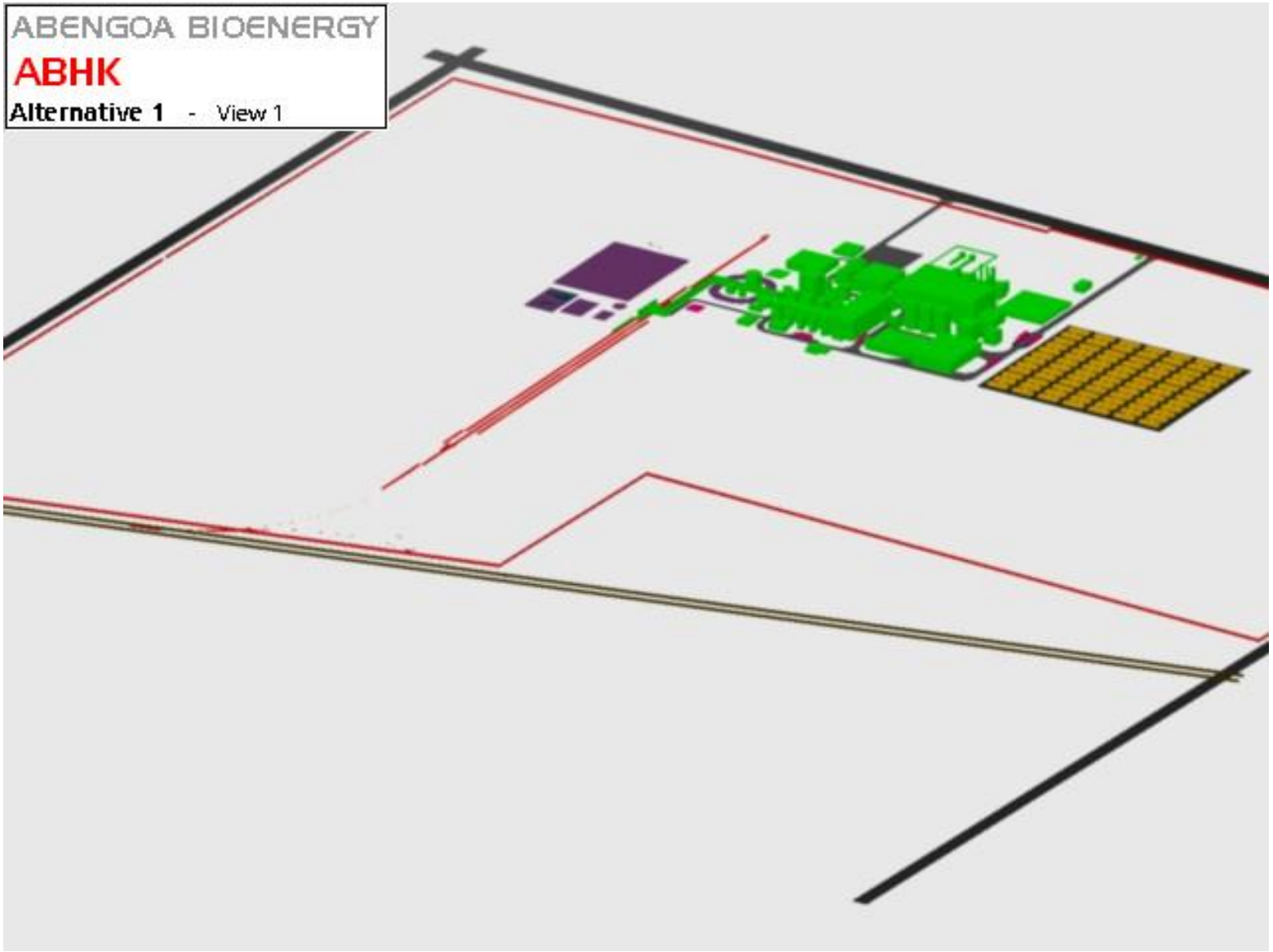
ABHK Site


Biorefinery Location
Additional Land Purchase
Road P
Road 10
Road 11
Road 12
Forewinds Golf Course
Cargill Seaboard Farms
West Industrial Park
At and Sf Railway
U56
Hugoton
Hugoton Municipal Airport
S24-T33S-R38W
S19-T33S-R37W
S17-T33S-R37W
S18-T33S-R37W
S8-T33S-R37W
S9-T33S-R37W
Main
1st
11th
K51
Optima
N

ABHK Site Layout



ABHK 3D Rendering

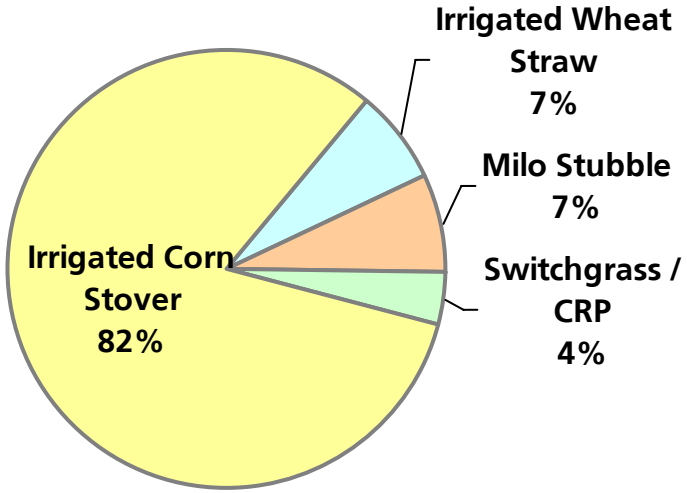


ABHK 3D Rendering

Biomass Feedstock

ABHK Biomass Feedstock Needs

- 669,000 "as is" tons of biomass per year
- Estimated 300,000 – 350,000 acres of land



Irrigated Wheat Straw

Milo Stubble

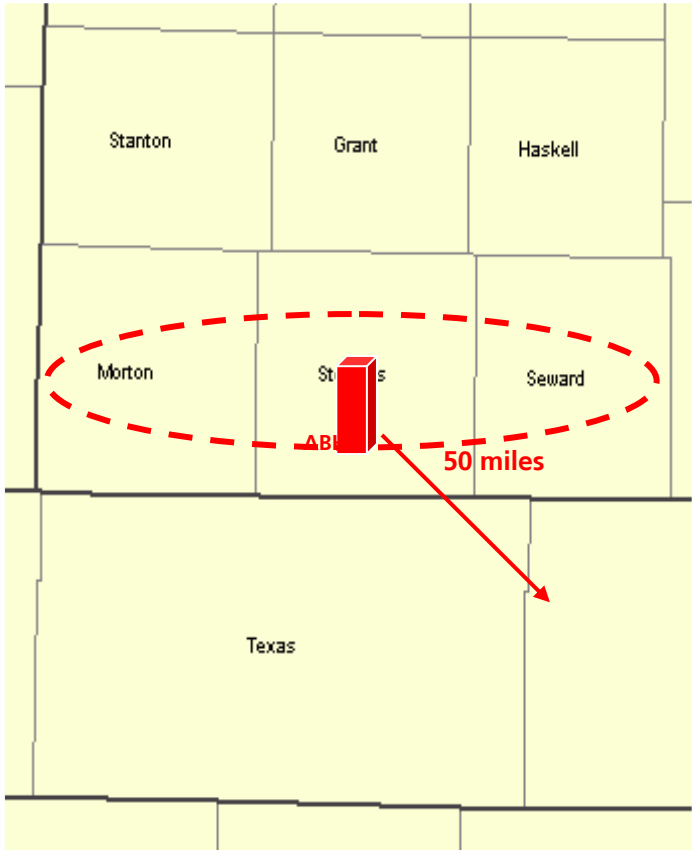
Switchgrass

Irrigated Corn Stover

CRP Grassland

Target Draw Area

- Stevens County, KS
- Seward County, KS
- Morton County, KS
- Haskell County, KS
- Grant County, KS
- Stanton County, KS
- Texas County, OK



10% - 12% of available biomass is required within 50 mile radius

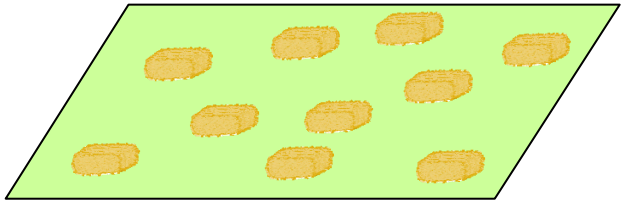
Biomass Harvesting and Transport

Harvest

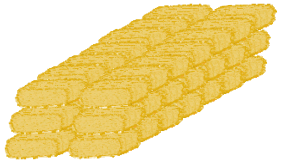
Wheel Rake

Bi directional Tractor

Large Square Baler



3’ x 4’ x 8’ Bales in Field



2 wide x 3 tall x 7 long
on 53’ flat bed trailer

Bale weight = 1000lbs

Bale Density = 10.42 lbs / ft3

42 bales / truck = 21 wet tons

These are conservative inputs

Transport

Bale Accumulator

Bale Squeeze Loads Truck

Flat Bed Trailer Transport

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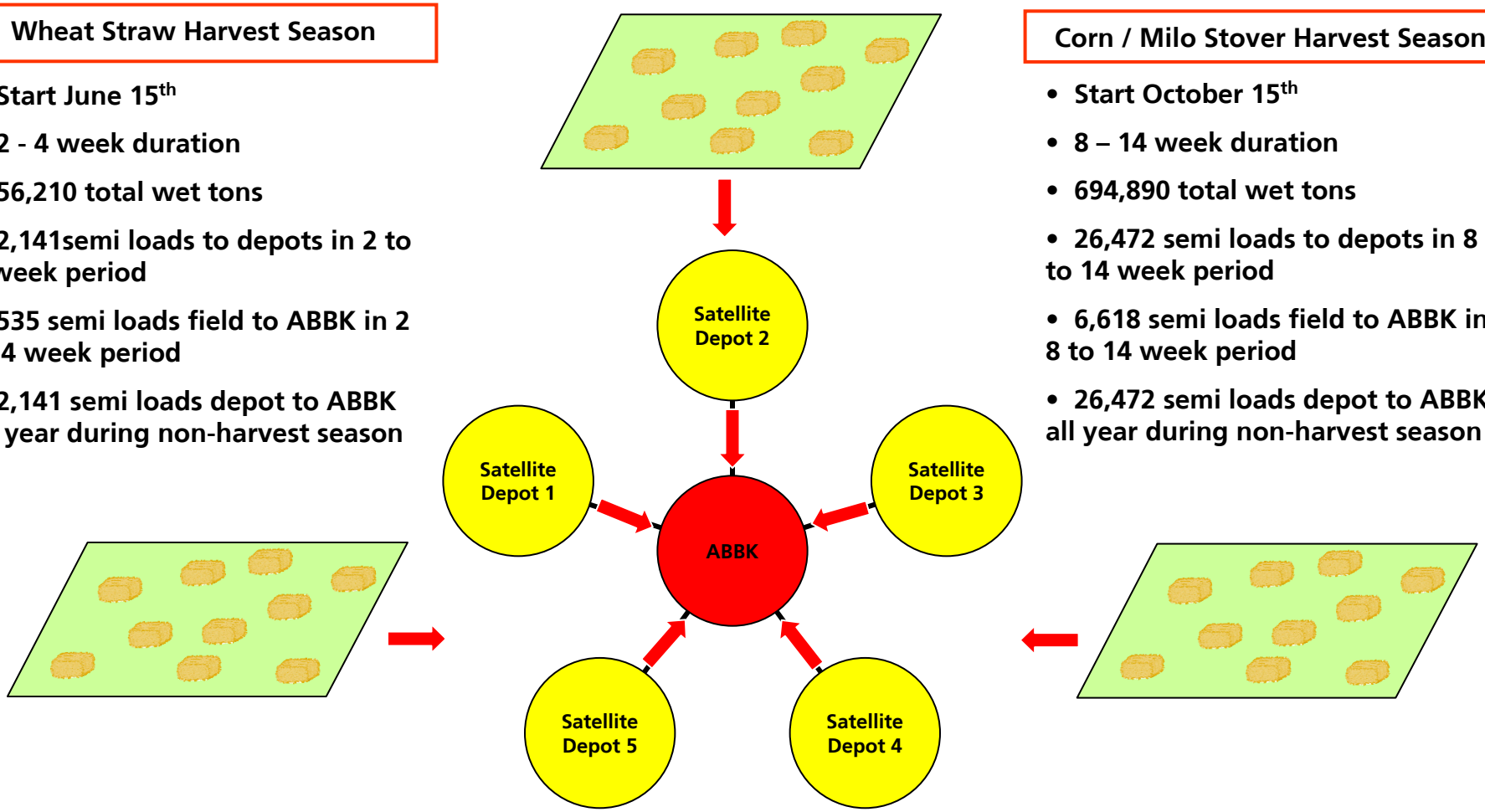
Truck Transport – Off Site Storage Logistics

Wheat Straw Harvest Season

- Start June 15th
- 2 - 4 week duration
- 56,210 total wet tons
- 2,141semi loads to depots in 2 to 4 week period
- 535 semi loads field to ABBK in 2 to 4 week period
- 2,141 semi loads depot to ABBK all year during non-harvest season

Corn / Milo Stover Harvest Season

- Start October 15th
- 8 – 14 week duration
- 694,890 total wet tons
- 26,472 semi loads to depots in 8 to 14 week period
- 6,618 semi loads field to ABBK in 8 to 14 week period
- 26,472 semi loads depot to ABBK all year during non-harvest season



Overall Logistical Scheme

- After biomass is harvested into package form, it is transported via flat bed trailer to nearest satellite depots
- Estimated that 80% of biomass packages will go from field to satellite depot for storage then to ABBK

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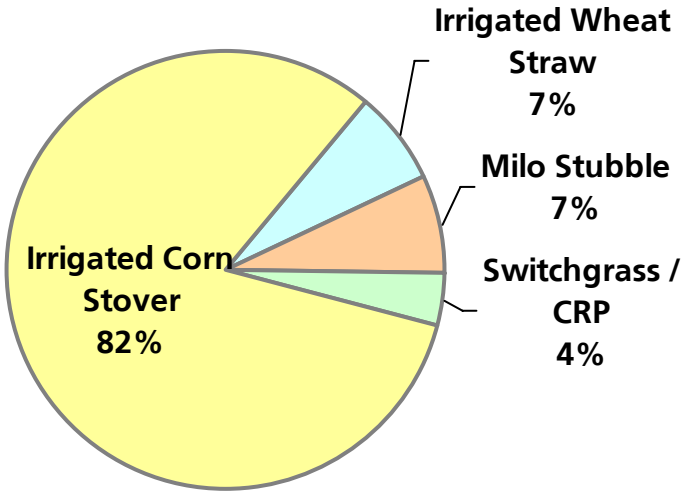
Region of Influence

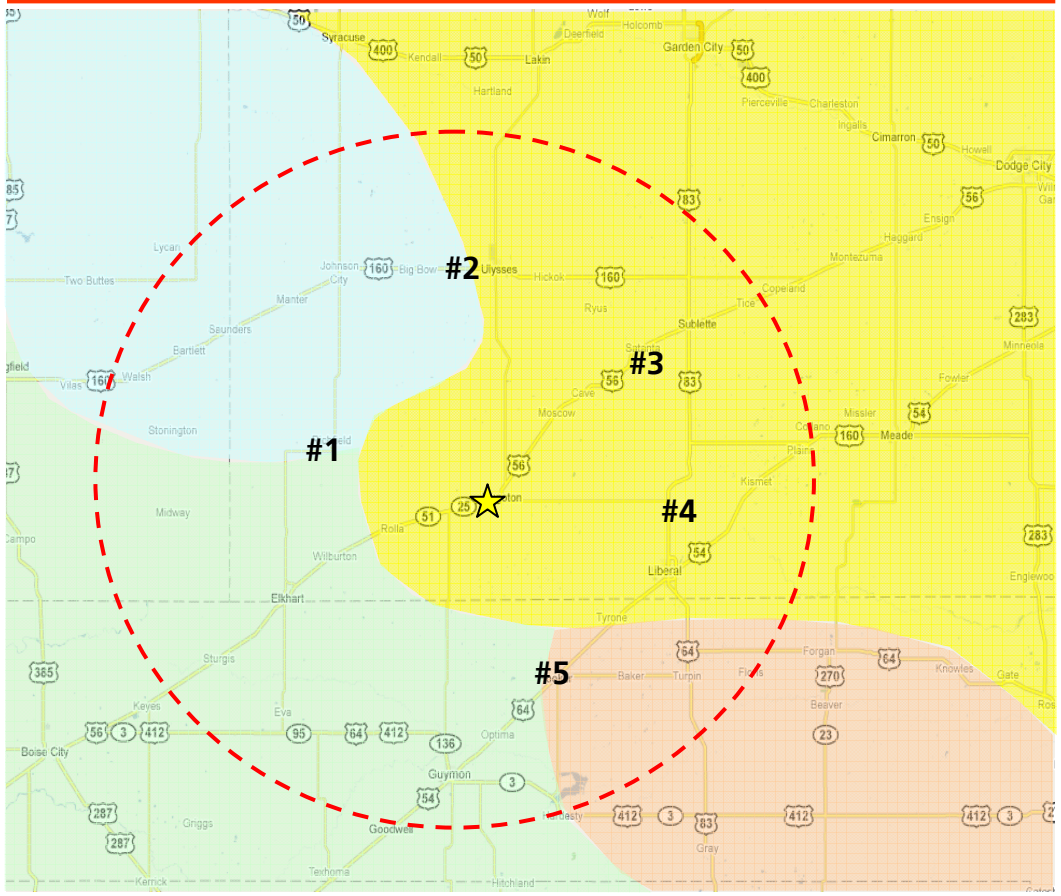
Counties in Draw Area

- Stevens County, KS
- Stanton County, KS
- Morton County, KS
- Seward County, KS
- Haskell County, KS
- Grant County, KS
- Texas County, OK

Feedstock Breakdown



Procurement Draw Area (~50 mile radius)



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ABHK Project Schedule

Done

- Project Office created, Detailed Engineering launched
- Site secured, water rights secured, all major permits in process

Q4-2009

- Substantial Completion Detailed Engineering
- Secure Air Permit
- Secure Power Purchase Agreement
- Secure Biomass supply commitments

Q1-2010

- NEPA EIS process complete
- Close Loan Guarantee and Financing
- Construction Begins

Q1-2012

- Construction Complete
- Plant Start Up

Conclusions

- Lignocellulosic bioethanol is an Abengoa Bioenergy goal.
- Pilot and Demonstration plants will provide information for:
  - Technology optimization.
  - Investment reduction in future construction plants.
  - Operational cost reduction.
  - Improve the enzymes used in the process.
- The energy crops development is critical for new process.
- New Integrated Biorefinery with renewable power commercially viable, with policy support for cellulosic biofuels and renewable biomass based power.