ABENGOA

2014 DOE Biomass Program
Integrated Biorefinery Project
Comprehensive Project Review

DOE Award No. DE-FC36-07GO17028
April 16, 2014

Principal Investigator – Gerson Santos-Leon
Project Director – Joseph Bradford
Abengoa Bioenergy Biomass of Kansas, LLC

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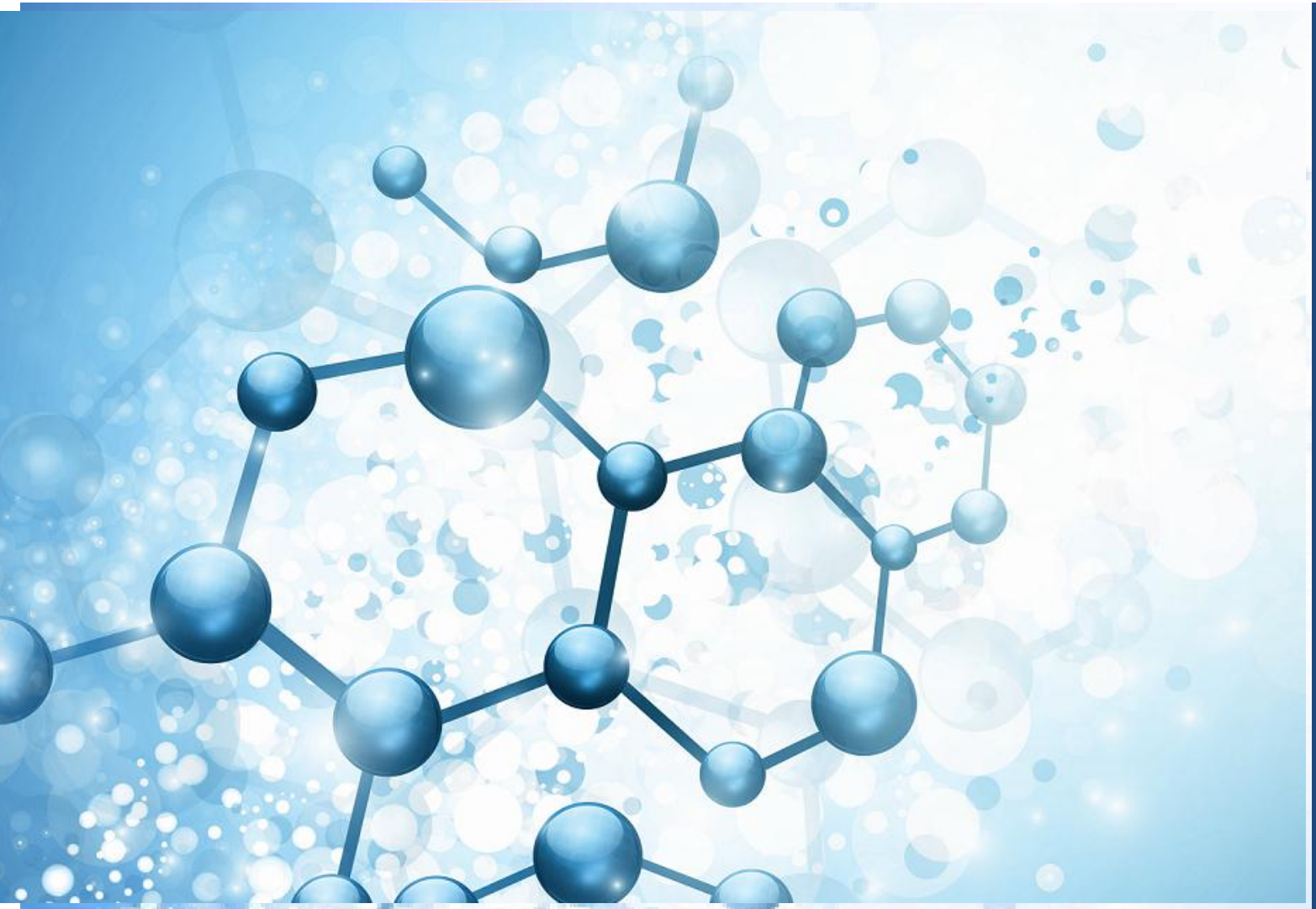


The global biotech ethanol company

ABENGOA BIOENERGY

...becoming the only global ethanol company

York, NE
208 ML
Since 2001

Colwich, KS
95 ML
Since 2001

Portales, NM
114 ML
Since 2001

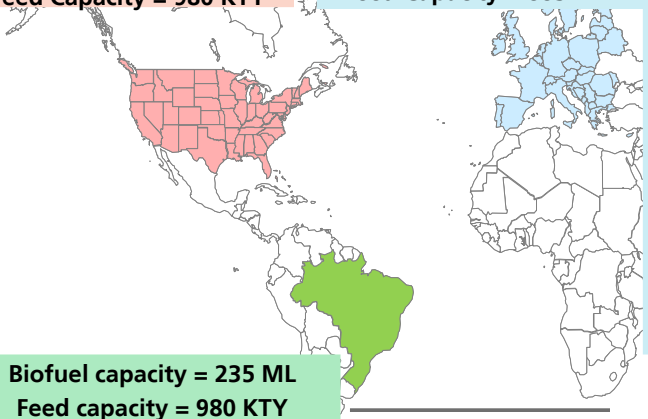
Ravenna, NE
341 ML
Since 2007

Evansville, IN
341 ML
Since 2011

Granite City, IL
341 ML
Since 2011

Biofuel Capacity = 1,440 ML
Feed Capacity = 980 KTY

Biofuel Capacity = 1,500 ML
Feed Capacity = 885 KTY



Cartagena, Sp
150 ML
Since 1999

La Coruña, Sp
195 ML
Since 2001

Salamanca, Sp
200 ML
Since 2006

Lacq, FR
250 ML
Since 2007

Cadiz, Sp
225 ML
Since 2009

Rotterdam, NE
480 ML
Since 2010

Biofuel capacity = 235 ML
Feed capacity = 980 KTY

Sao Luis, SP
91 ML
Since 2007

Sao Joao, SP
144 ML
Since 2007

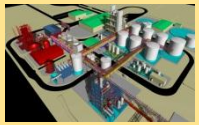
San Antonio de Posse (SAP), SP
0.3MT
Since 2011

Camilo Ferrari, SP
0.3MT
Since 2011

Global Production

Ethanol (ML):	2,252
Sugar (KTPY):	451
Feed (KTPY):	1,509
Electricity (MWh):	1.47M
Biodiesel (ML):	105

2G Assets



Commercial Biomass Plant Hugoton (KS, US)
95 ML
2014

Biomass **Demonstration** Plant in BCyL (Salamanca, Spain)
5ML
Since 2009

Biomass **Pilot** Plant in York (NE, US)
0.1 ML
Since 2007

Strong position through diversification

Abengoa Bioenergy has evolved…

1994

- ✓ Acquisition of High Plains Corporation in U.S.
- ✓ 650 ML (170 MG) capacity in US and EU
- ✓ Need for lignocellulosic ethanol identified; Enzymatic Hydrolysis technology selected

2004

- ✓ Acquisition Dedini Agro, Brazil
- ✓ Assets in 5 countries, three continents; global 3175 ML capacity
- ✓ 2G technology program developed; 2G ethanol pilot & demo plants built
- ✓ Construction of 1st cellulosic ethanol commercial scale plant started

2014 Forward

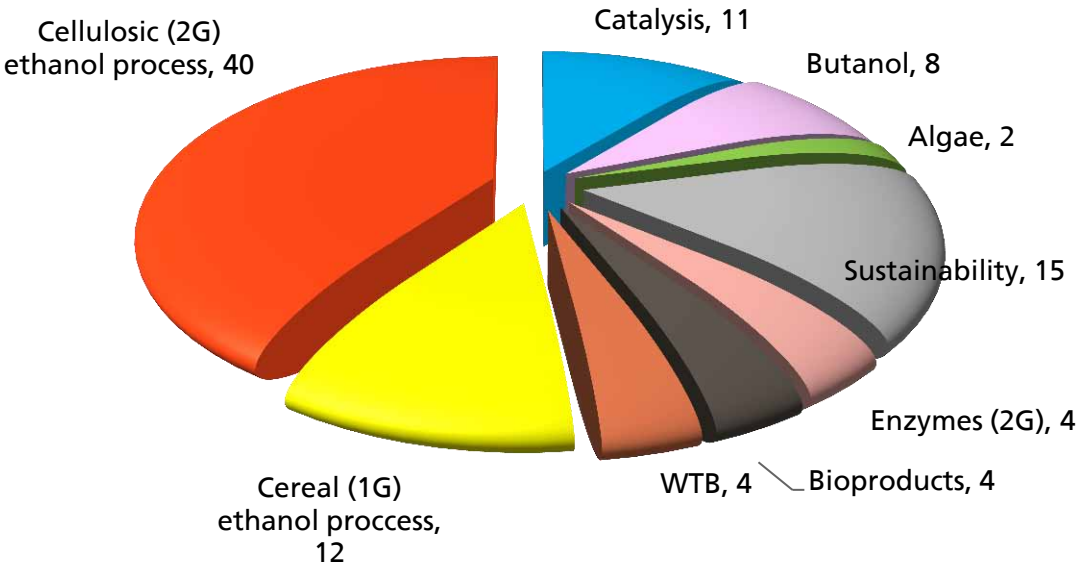
- ✓ Expected startup of first cellulosic ethanol commercial scale plant
- ✓ 2G technology licensed to 3rd parties
- ✓ Waste-to-biofuels technology developed
- ✓ Develop new sugar-based applications for fuel and chemicals market e.g. butanol, jet fuel, diesel

Strategy & technology

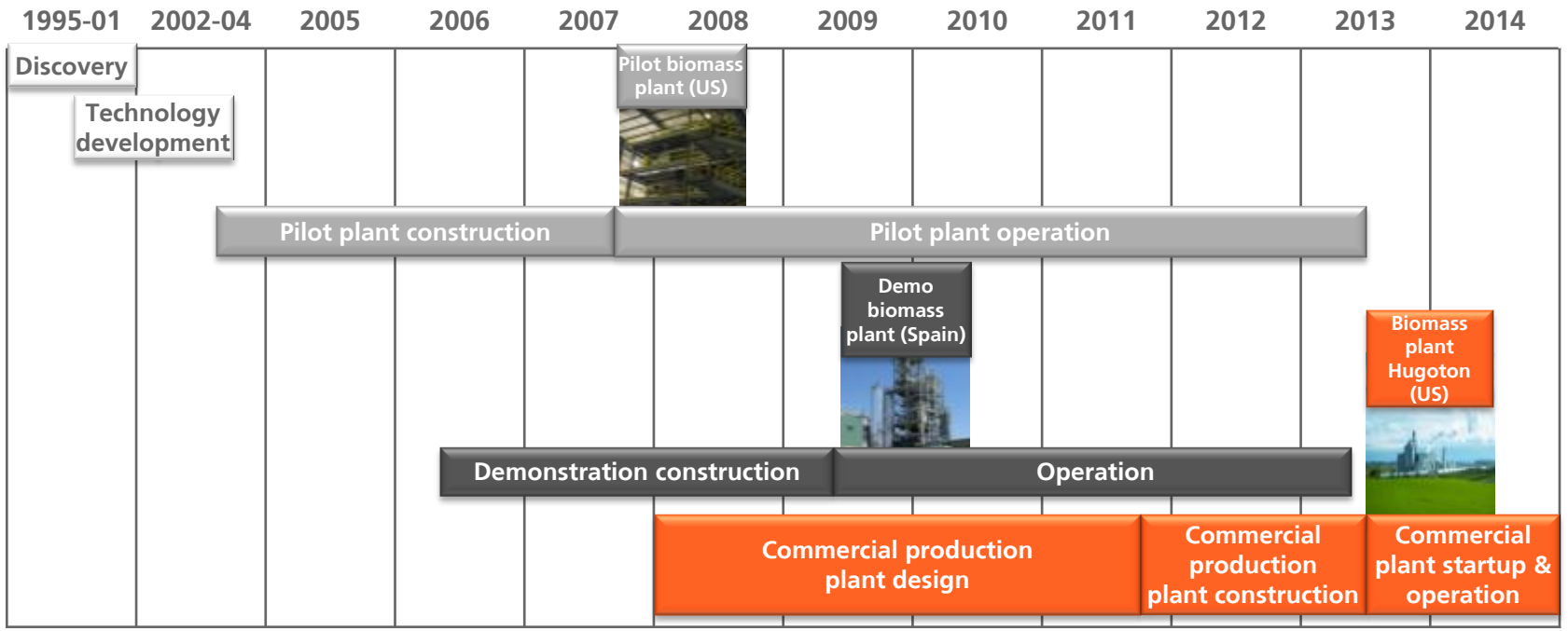
Patent ownership continues to increase

Portfolio

Cumulative number of patent application filed (total 100)



…and after investing for 10 years…

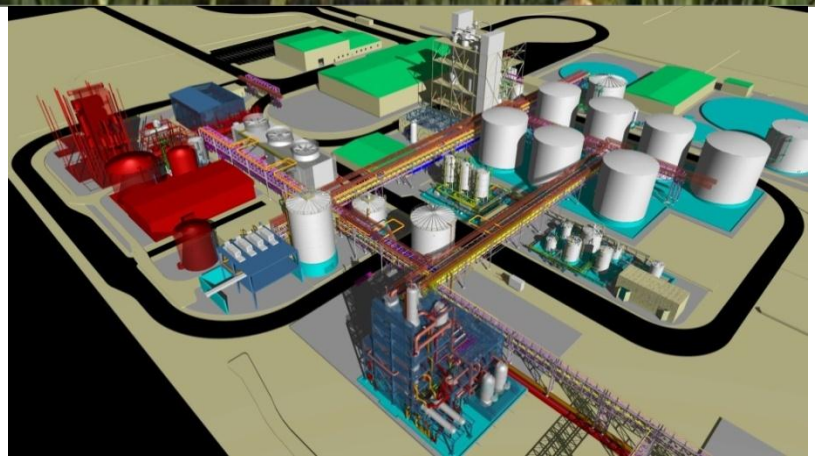


- 11 years of technology development
- +100 patents ongoing
- +700 M USD invested
- 104 M USD DOE loan guarantee federal financing for Hugoton project
- +30,000 hours of operation in pilot plant
- +6,000 hours of operation in commercial demo plant

10 years of technology progress through stage-gate process

ABENGOA

General Overview



General Overview

Project Overview

Project Description & Goal	▪ Abengoa Bioenergy Biomass of Kansas ("ABBK") facility is a cellulosic biomass enzymatic hydrolysis Biorefinery with an integrated, co-located biomass cogeneration plant. ▪ The facility is located in the City of Hugoton, Stevens County, State of Kansas, on approximately 400 acres of property with an adjacent 427 acres of irrigated farm land. ▪ The project's primary objective is to demonstrate commercial viability of the enzymatic hydrolysis conversion of biomass to ethanol ▪ The facility produces 25 million gallons per year of denatured fuel ethanol and 21-MW gross electrical power production at a 70% to 83% GHG reduction
Core Technologies	The Biorefinery is comprised of three core new technologies: ▪ Pretreatment with dilute acid and steam; ▪ Enzymatic digestion of cellulose; and; ▪ Co-fermentation of C6 and C5 sugars
Biorefinery, Balance of Plant	▪ The enzymatic hydrolysis core technologies are followed by distillation and dehydration to generate ethanol for sale. ▪ Filter press system concentrate whole stillage insoluble solids into biomass solid cake and syrup (thin stillage). The solid cake and thin stillage are combusted in the biomass boiler system to offset feedstock usage. ▪ A wastewater treatment system is comprised of an anaerobic Mbr system followed by an activated sludge technology aerobic system which processes pretreatment condensate and stillage evaporator condensate. The WWT system reclaims water for use in the facility and utilizes the biogas generated to offset feedstock usage.

General Overview

Project Overview

Cogeneration Plant	▪ A 350 KPPH biomass boiler system receives a blend of biomass feedstock, solid cake, syrup, wastewater treatment plant sludge, and biogas. Biomass feedstocks may range from corn stover, wheat straw, energy crops, wood chips. Boiler system ash is hauled to the biomass suppliers for crop land nutrient replenishment and on-site build of a visual community buffer. ▪ A 25 MVA steam turbine generator set produces a total of 21-MW gross electrical production, which is used to supply the bio-refinery and supplement the region's grid. ▪ Turbine steam extractions supply the bio-refinery steam requirements.
Biomass feedstock system	▪ Biomass feedstock is supplied to the facility through the plant's off-site traditional harvesting and logistics system comprised of harvesting, collection, storage, transport, and logistics management operations.
Rail & Truck System	▪ A rail system accommodates chemicals receiving, ash product shipping and ethanol production shipping. ▪ The plant's trucking system provides biomass feedstock receiving, chemical receiving, ethanol production shipping, and boiler ash product shipping.

Hugoton project highlights

- Capacity: 25 MGPY ethanol from biomass
- Electricity capacity: 21-MW electrical power. Excess power to the grid
- Location: Hugoton, Kansas
- Site: 400-acre parcel
- Feedstock: Corn stover, wheat straw, seasonal grasses
- Biomass: ~320,000 dry tons per year

- Cogen start-up: December 2013
- Objective is to build first-of-its-kind commercial-scale enzymatic hydrolysis conversion of biomass to ethanol to operate at 2.15 $/gal cost in 2015
- DOE awarded $97 MM cost share and $132 million federal loan guarantee to facilitate design development and construction

Scope tracking Summary (2008 to April 2014)

	Date	Remarks
1. Hybrid plant – Grain ethanol 84 MGPY Biomass ethanol 11.4 MGPY	2008	Original Project Concept
2. Biomass with Cogen - Ethanol 11.4 MGPY Electrical Cogeneration 20 to 60 MW Lignin 21.2K DT/yr Syngas 157 MM BTU/hr	2009	Movement away for grain based ethanol plus GHG reduction
3. Biomass with Cogen - Ethanol 16 MGPY Electrical Cogeneration 125 MW	Aug-2009	Economy of scale for Ethanol and Cogeneration plant
4. Biomass with Cogen - Ethanol 25 MGPY Electrical Cogeneration 21 MW	Aug-2010	Economy of scale for Ethanol Failure of REC legislation reduced cogen to only GHG reduction

General Overview

Current Status and Progress to Date

Cogeneration plant commissioned in December 2013. **Steam turbine generator was synchronized to the grid and began providing power in December 2013** **Working minor punch list items**
Ethanol plant **Mechanical completion in late April** **Commissioning of various areas has begun.**
Plant Staffing is complete **Maintenance procedures at 27%, Standard operation procedures at 77%** **All utilities in place and operational** **All permits in place**

General Overview

Status as of March 2012

General Overview

Status as of April 2013

General Overview

Status as of December 31 2013

General Overview

Status as of December 31 2013

General Overview

Status as of December 31 2013

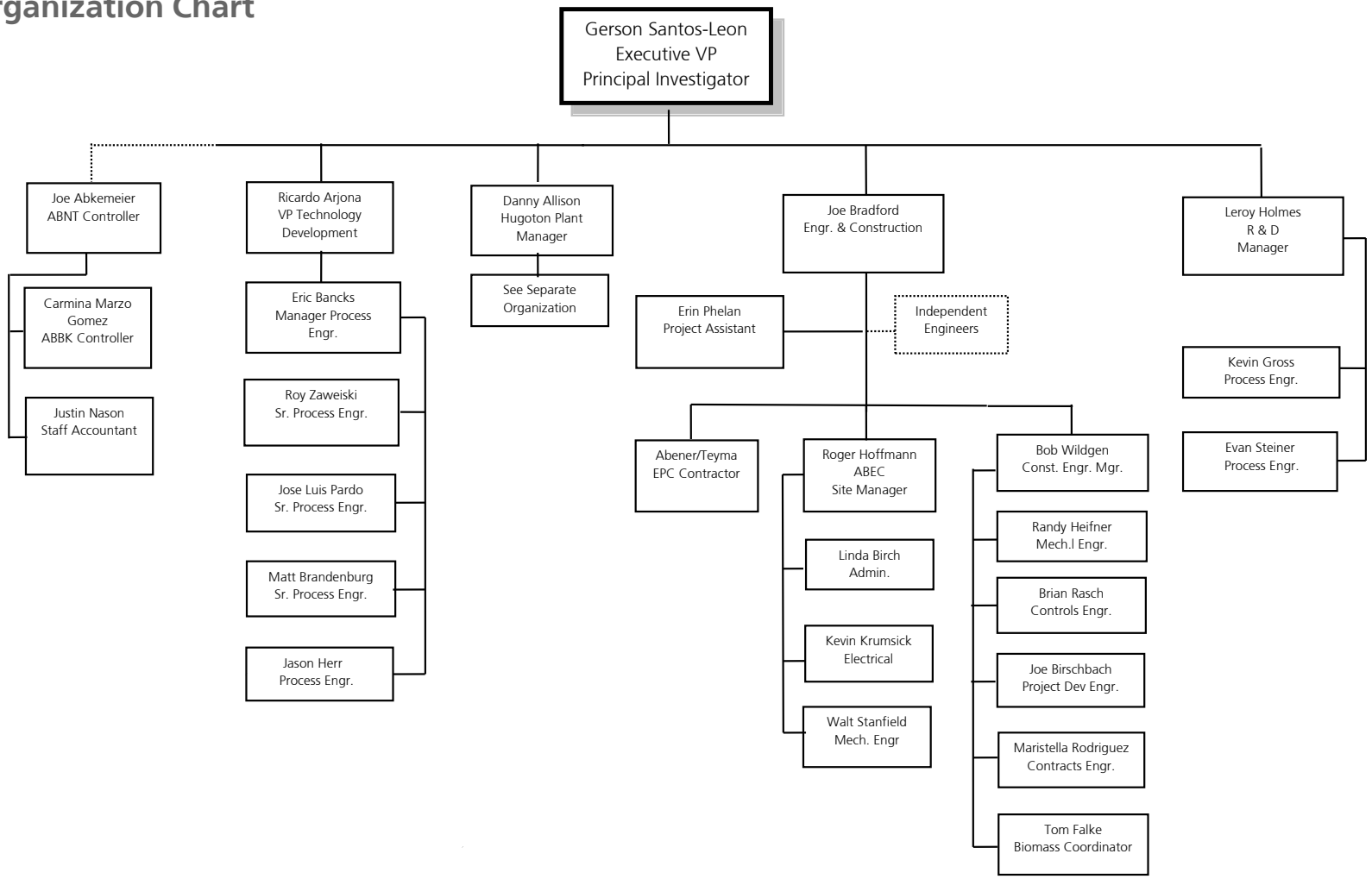
General Overview

Comments/items from last review

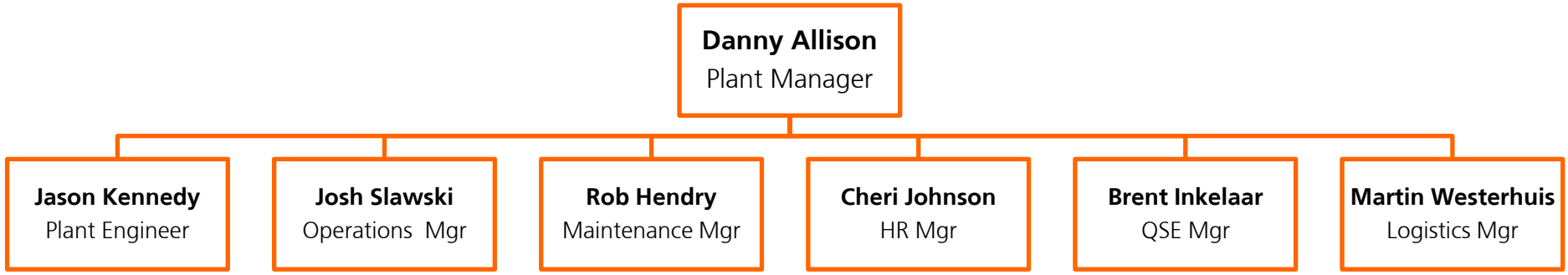
1. Company Structure and Project Management

1A – Project Management

Organization Chart



ABBK Plant Managerial Organization Chart



- Full site staff added since 2013 CPR meeting

Administration	1
Human Resources	1
Logistics	11
Quality, safety and environmental	9
Maintenance	13
Engineering	2
Operations	1
Production	30
Total plant staff	68

ABBK Key Team Members / Core Competencies

Ricardo Arjona, PhD	
Process Director **ABNT**	▪ Subject matter expert – Enzymatic Hydrolysis ▪ Technical Expertise – Bench, pilot, and demonstration-scale development ▪ Technical Expertise – emerging technology development ▪ Technical Expertise – commercial project execution
Quang Nguyen	
Research & Development Director	▪ Subject matter expert – Enzymatic Hydrolysis ▪ Technical Expertise – Bench, pilot, and demonstration-scale development ▪ Technical Expertise – emerging technology development ▪ Technical Expertise – commercial project execution
Eric Bancks	
Process Engineering Manager	▪ Technical Expertise – Enzymatic Hydrolysis ▪ Technical Expertise – Bench, pilot, and demonstration-scale development ▪ Technical Expertise – emerging technology development ▪ Technical Expertise – commercial project execution and plant operations
Matthew Brandenburg	
Process Lead	▪ Technical Expertise – Enzymatic Hydrolysis ▪ Technical Expertise – Bench, pilot, and demonstration-scale development ▪ Technical Expertise – emerging technology development ▪ Technical Expertise – commercial project execution and plant operations

ABBK Key Team Members / Core Competencies

Dan Morgan	
AFK Associate Director	▪ Subject matter expert – agri-science ▪ Contractual arrangements
Thomas Robb, PhD	
Biomass Procurement Manager	▪ Subject matter expert – agri-science ▪ Technical Expertise – Bench, pilot, and demonstration-scale development ▪ Technical Expertise – emerging technology development
Thomas Falke	
AFK Associate Director	▪ Subject matter expert – agri-science ▪ Technical Expertise – Bench, pilot, and demonstration-scale development ▪ Technical Expertise – emerging technology development

ABBK Key Team Members / Core Competencies

Joe Bradford	
Project Director **Engineering, Construction** **EPC contract, ABBK**	▪ Technical Expertise – Engineering Design, EPC Execution and Project Management ▪ Core Competency – Engineering and Construction project execution
Bob Wildgen	
Business Development **Construction Management**	▪ Technical Expertise – Project & Business Development, Analysis, Project Construction Management ▪ Core Competency – Chemical Engineering
Eric Bancks	
Process Design Coordinator	▪ Technical Expertise – Boilers, utilities, operations and general process integration ▪ Core Competency – Chemical Engineering
Gerson Santos-Leon	
Principal Investigator **Executive Vice President** **ABNT**	▪ Technical Expertise – Enzymatic Hydrolysis ▪ Core Competency – Bench, pilot, and demonstration-scale development ▪ Core Competency - Executive Management, Institutional Relations, Government Affairs

Organizational management of tasks	
Organization, Roles, & Responsibilities	▪ Organizational Chart ▪ Roles and Responsibilities Chart (RACI)
Operations Platform	▪ Meridian-Prolog Total Project Management System/Converge

Roles & Responsibilities Chart (RACI)	
Responsible (“R”)	▪ The “doer” is the individual(s) who actually complete the task. The “doer” is responsible for action / implementation. Responsibility can be shared.
Accountability (“A”)	▪ The accountable person is the individual who is ultimately answerable to the activity or decision; includes “yes” or “no” authority and veto power.
Consult (“C”)	▪ The consult role is individual(s) consulted prior to a final decision or action. This is a pre-determined need for two-way communication. Input from designated position required.
Inform (“I”)	▪ This is individual(s) who needs to be informed after a decision or action is taken. They may be required to take action as a result of the outcome. It is a one-way communication.

RACI Chart	Pilot Plant	Demo Plant	Technology Transfer	Process Eng Package
Eric Bancks Process Manager	Responsible	Consult	Responsible	Responsible
Matt Brandenburg Process Lead Engineer	Responsible	Consult	Responsible	Responsible
Ricardo Arjona Process Director	Accountable	Consult	Accountable	Accountable
Quang Nguyen R&D Director	Consult	Accountable	Consult	Consult
Joe Bradford Project Director	Consult	Consult	Consult	Consult
Roy Zawielski Process Lead Engineer	Consult	Consult	Responsible	Responsible
Eric Bancks Process Coordination Engineer	Consult	Consult	Consult	Responsible
Gerson Santos-Leon Project Executive	Consult	Consult	Consult	Consult

RACI Chart continued	Biomass Procurement	Business Agreements	Permits	Finance	EPC
Joe Birschbach Project Development	Consult	Responsible	Responsible	Consult	Consult
Bob Wildgen Project Dev and Construction	Consult	Responsible	Responsible	Consult	Consult
Ricardo Arjona Process Director	Consult	Consult	Consult	Consult	Consult
Quang Nguyen R&D	Consult	Consult	Consult	Consult	Consult
Joe Bradford EPC and Construction	Consult	Accountable	Accountable	Accountable	Responsible
Dan Morgan Biomass Procurement	Responsible	Inform	Inform	Inform	Inform
Carmen Marzo Accounting	Consult	Consult	Consult	Responsible	Consult
Eric Bancks Process Design Coordination	Consult	Consult	Consult	Consult	Consult
Gerson Santos-Leon Project Executive	Accountable	Accountable	Consult	Accountable	Consult

IP	License	Alternative	Comment
Fermenting organism	Fermentis	Terranol	Entered into a joint development agreement with Fermentis to demonstrate and commercialize Fermentis technology purchased from Butalco
Cellulase enzyme	Abengoa	Dupont	Novo is a third option in the future
Plant equip and other chemicals	ABNT IP licensed to ABBK	-	Purchase agreement not required for chemicals
Enzymatic Hydrolysis process	ABNT IP Licensed to ABBK	-	

1. Company Structure and Project Management

1B Performance against Baseline

Performance Baseline Critical Items

Critical Path	▪ Loan Guarantee Application - Complete ▪ Finalization of Waster Water Treatment Design - Complete ▪ Process Package Design – Completed May 2011 ▪ Environmental Impact Statement – Completed July 7, 2011 ▪ Securing Sufficient Biomass Supply Contracts – JV agreement ▪ Loan Guarantee Financial Closure – Completed Sep 2011 ▪ Finalization of Enzyme Supply – Complete ▪ Stillage Process Design – Complete ▪ Pretreatment design and sourcing – Complete ▪ Design and Construction – Complete
Challenges	▪ Process startup with commercial scale equipment ▪ Material movement through the system ▪ Contaminations competing for the sugars ▪ Maintaining target stream days of production

Baseline – Owner's Schedule 7/21/11 Corporate Activities

Corporate Activities	Planned Completion	Actual Completion or Current Projection
FEL2 Review	12/2/10	Completed 12/15/2010
FEL3 & Management P&ID Design Review	4/29/11	Completed 5/20/11
Initial Process Hazard Analysis	6/3/11	Completed 6/3/11
Engineering/Design Firm QC Audit	10/7/11	Completed 10/14/11
Basic Engineering Reviews/Approvals	12/16/11	Completed 12/21/11
Detailed Design Reviews/Approvals	9/28/12	As planned
HAZOP/PHA safety Review	1/27/12	5/11/12 and 1st Qtr13
Construct ability Review	3/15/12	Completed 4/30/12, 9/14/12 and 1/12/13
Pre-Startup Safety Review	1/10/13	8/15/13 and 1/10/14
Pre-Operations Safety Review	9/1/13	10/1/13 and 3/1/14
SOP Development	6/26/13	8/15/13 and 12/15/13
Plant Staffing	8/15/13	12/15/13
Personnel Training	9/28/13	On track – in progress

- Full HAZOP delayed due to design changes in the CIP system

Baseline – Owner's Schedule 7/21/11
EPC Contractor Execution Schedule

EPC Contractor Execution Schedule	Planned Completion	Actual Completion or Current Projection
EPC Contract Execution - LNTP	6/30/11	Completed as Planned
Owner/Contractor FEL-3	12/16/11	Completed except CIP Mods
Basic Engineering	12/15/11	Completed except CIP Mods
Detailed Engineering	9/28/12	General design as planned CIP and Pretreat 1st Qtr13
Procurement	9/13/12	Major Equipment as planned, Instruments and valves by12/15/12
EPC Contractor Partial Mobilization	7/1/11	Completed as Planned
EPC Contractor Full Mobilization	10/1/11	Completed as Planned

Baseline – Construction Pretreatment April 9, 2014

Baseline – Owner's Schedule 7/21/11
Key Project Milestones

Key Project Milestones	Planned Completion	Actual Completion or Current Projection
Loan Credit Committee	7/27/2011	Completed as Planned
Credit Package to OMB & Treasury	7/25/2011	Completed as Planned
Credit Review Board	8/15/2011	Completed as Planned
EPC Contract LNTP	6/30/2011	Completed as Planned
Loan Guarantee Financial Close	9/28/2011	Completed as Planned
EPC Contract FNTP	9/30/2011	Completed as Planned
All major permits in place	12/31/2011	Completed as Planned
First DOE Funding LG first Draw	7/2/2012	1/23/2014
Power Ready- Substation	11/30/2012	5/15/13
Mechanical Completion - Cogen	6/30/2013	12/27/13
Mechanical Completion – Enzymatic Hydrolysis	6/30/2013	4/30/43
Plant Reception	12/31/2013	3/31/15

Cogen Project Milestones

Certification Item		Original	Actual
	Co-Generation (.2774825) PO#4500146679	24 Month	Completion Date
0A	Limited Notice to Proceed (PO #1)	25-Oct-11	3-Nov-11
0B	Pre-Procurement (PO #2 and 3#)	9-Nov-11	3-Nov-11
1	Down Payment	1-Oct-11	3-Oct-11
2	Begin Site Prep Construction	16-Nov-11	20-Oct-11
3	Issue P.O. Cooling Tower	9-Dec-11	7-Dec-11
4	Issue P.O. Raw water tanks	27-Jan-12	7-Dec-11
5	Issue P.O. for Raw Water Equipment	6-Mar-12	9-Nov-11
6	Issue P.O. Cooling Water Pumps	3-Apr-12	18-Jan-12
7	Issue P.O. Wet Cake Load-Out Equipment	7-Jun-12	2-Sep-12
8	Begin STG foundation	11-Jul-12	3-Aug-12
9	Complete Boiler Foundation Installation	18-Aug-12	13-Mar-12
10	Begin Installation of Boiler	19-Sep-12	29-Mar-12
11	Complete Cooling Tower Basin Installation	16-Oct-12	12-Aug-12
12	Begin Setting Wet Cake Load-Out Equipment	13-Nov-12	3-Jul-13
13	Complete STG Foundation Installation	31-Dec-12	12-Sep-12
14	Complete Erection of Cooling Tower	9-Jan-13	12-Oct-12
15	Complete Installation of STG	28-Feb-13	1-Dec-13
16	Complete Setting of Raw Water Equipment	16-Apr-13	28-Apr-13
17	Complete Installation of Boiler	13-May-13	9-Dec-13
18	Mechanical Completion	30-Jun-13	1-Dec-13
19	Successful Performance Test	28-Sep-13	1-Sep-14

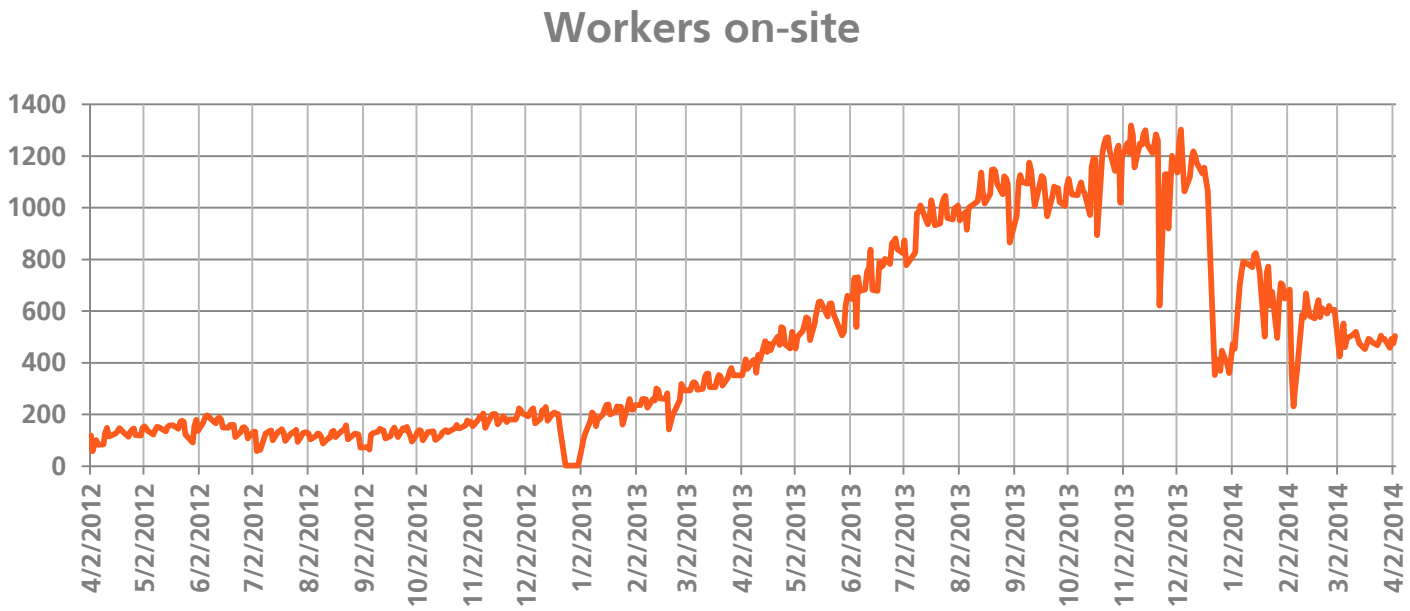
Ethanol Project Milestones

	Certification Item	Original	Actual
	Ethanol Plant (.7225175) PO#4500147241	24 Month	Completion Date
0A	Limited Notice to Proceed (PO #1)	25-Oct-11	4-Nov-11
0B	Pre-Procurement (PO #2 and #3)	9-Nov-11	4-Nov-11
1	Down Payment	1-Oct-11	3-Oct-11
2A	Issue Primary P.O. Pre-Treatment Equipment	11-Nov-11	20-Oct-11
2B	Issue Secondary P.O. Pre-Treatment Equipment	NA	12-Jul-12
3	Begin Pile Installation (Fermentation Area)	26-Dec-11	15-Dec-11
4	Begin Ring wall Foundation Installation (Fermentation Area)	31-Jan-12	10-Jan-12
5	Issue P.O. Evaporator	1-Feb-12	1-Nov-11
6	Begin Erection of Fermenters	27-Mar-12	21-Feb-12
7	Complete DDE Foundation Installation	9-Apr-12	10-Jul-12
8	Begin Setting of DDE Equipment	10-May-12	12-Dec-12
9	Begin WWTP Foundation Installation	10-Jun-12	18-May-12
10	Begin Erection of DDE Steel Structure	25-Jul-12	18-Jan-13
11	Begin Setting of Pre-Treatment Equipment	29-Aug-12	1-Apr-13
12	Complete Biomass Handling Foundation Installation	5-Sep-12	15-Jan-13
13	Begin Installation of Biomass Handling Structure	12-Oct-12	1-Mar-13
14	Complete Erection of Fermenters	4-Nov-12	18-Aug-12
15	Begin Installation of Pipe Racks (Fermenter Area) #2	31-Dec-12	1-Apr-13
16	Complete Installation of WWTP Structures	19-Jan-13	12-Sep-13
17	Complete Setting of Pre-Treatment Equipment	21-Feb-13	1-Oct-13
18	Complete Erection of DDE Steel Structure	17-Mar-13	1-Jul-13
19	Complete Setting of Ethanol Load-Out Equipment	30-Apr-13	25-Feb-14
20	Complete Installation of Biomass Handling Equip	3-May-13	1-Dec-13
21	Mechanical Completion - Ethanol	30-Jun-13	1-Apr-14
22	Successful Performance testing	28-Sep-13	1-Mar-15

Workforce Statistics

Current site work staff is approximately 460

Will drop off sharply in May 2014



Construction Status

Discipline	Weight	Actual Cumulative Progress	Target Cumulative Progress (T4)	Target Deviation
Engineering	12.0%	100%	100%	0%
Purchases	4.0%	100%	100%	0%
Manufacture and Supply	38.0%	100%	100%	0%
Construction (split below)	46.0%	96.6%	100%	-3.4%
Construction - Civil	13.0%	95.9%	100%	-4.1%
Construction - Mechanical	27.0%	97.7%	100%	-2.3%
Construction - Electrical	3.0%	94.1%	100%	-5.9%
Construction - I&C	1.0%	93.9%	100%	-6.1%
Start-up & Commissioning	2.0%	58.4%	75.5%	-17.1%
Total Project	100.0%	97.7%	99.5%	-1.8%

Performance Testing

Ethanol Facility Guaranteed Values

1) Ethanol Yield ≥ 75 std gal anhydrous ethanol/dry ton of biomass [1]
2) Ethanol Production ≥ 2906 std gal anhydrous ethanol/hour
3) Biomass Throughput ≥ 930 dry tons/day[1]
4) Ethanol Plant Power Consumption ≤ 6.88 kW/std gal anhydrous ethanol
5) Ethanol Plant Steam Consumption ≤ 99 lbs/std gal anhydrous ethanol
6) Sulfuric Acid (93 wt%) Consumption ≤ 0.68 lb/std gal anhydrous ethanol
7) Media (71 wt%) Consumption ≤ 0.36 lb/std gal anhydrous ethanol
8) Ethanol Plant Anhydrous Ammonia Consumption ≤ 0.18 lb/std gal anhydrous ethanol
9) Hydrated Lime Consumption (92% pure reagent) ≤ 393 lb/hr.

All guarantee values shall be achieved in compliance with all applicable Facility permits.

[1] Calculated at the throat of the digester.

Performance Testing

Cogeneration Facility Guaranteed Values

1) **Gross Power Output ≥ 20 MW continuous at 0.95 power factor.**
2) **Gross Boiler Output ≥ 325,000 lb/hr steam production at 900 psig and 750 F, or as necessary to achieve full Ethanol Facility guarantee capacity and yields and minimum gross power production of 20MW.**
3) **Boiler Efficiency HHV ≥ 70%, or as achieved on the boiler fuel blend necessary to achieve full Ethanol Facility guarantee capacity and yields.**
4) **Supplemental Biomass ≤ 72 dry tons per day, or as necessary to achieve full Ethanol Facility guarantee capacity and yields.**

All guarantee values shall be achieved in compliance with all applicable Facility permits.

1. Company Structure and Project Management

1C Risk Mitigation

Risk Management Process	▪ Risk management steps:
	  ▪ Risk identification
	  ▪ Risk analysis
	  ▪ Handling of risk

Risk Mitigation Plan as Management Tool	▪ Leverage low-risk power generation technology to improve the financing risk profile
	▪ Vertically integrated biomass supply including establishment of dedicated energy crops, such as perennial grasses
	  ▪ Define large scale sustainable production
	  ▪ Reduce risks traditionally associated with feedstock availability and cost
	▪ Convened conference to manage threats to project from collapse of starch ethanol market

Risk Mitigation	▪ Establish a process baseline to complete P&IDs and process package
	▪ Examine the cost and operability of the ABBK process design
	  ▪ Reduce capital equipment; simplify unit operations
	  ▪ Improve operability of the process
	▪ Make Decisions based on:
	  ▪ Economic Analysis – CapEx, OpEx, Proforma – IRR /NPV
	  ▪ Identification of data and assumptions to be used for analysis
	  ▪ Preliminary design & cost estimate
	  ▪ Risk Assessment
	  ▪ Experimental data leveraging
	  ▪ Identify additional data that can be developed beneficial to Plant Operation or Design

1C Risk Mitigation

Risk Category	Potential Negative Outcome	Potential Positive Outcome	Risk Mitigation
Financing	Banks will be hesitant to finance early projects because the process is new.	Early demonstrated successes and market conditions result in abundant financing options.	Pursue Loan Guarantee options through the DOE for first project to establish operating track record.
Feedstock Supply	Farmers not selling the biomass in the required quantities over a long period of time.	Market conditions remain attractive, creating attractive income opportunities for farmers and sustaining farmer interest in supplying feedstocks.	Enter into a proven joint venture and push for the early deployment of energy crops.
Competition with Starch-based Ethanol	Cellulosic Ethanol is not able to compete on a cost per gallon produced basis with starch-based ethanol.	Cellulosic ethanol production gains cost advantages over starch based ethanol via deployment with Cogeneration, reduction in enzyme cost, and chemical cost in successive installations.	Continually invest in new enzymes and new technologies to lower capital costs and operating costs. Continue to develop additional value added products from biomass to maximize the biomass platform financial potential at any given location (power, lignin, etc.)
Feedstock-Related Technology Developments	One-pass harvesting systems and improved baling technologies are not developed or are not adopted by farmers, delaying or preventing production cost reductions that could result from these technologies.	Anticipated technology developments occur and reduce feedstock production costs as expected.	Work closely with seed and equipment companies to promote the development and deployment of these technologies.
Fossil Fuel Prices	The price of oil and natural gas declines to the point where cellulosic ethanol production is not economically competitive.	Price of oil and natural gas remain high, continuing attractive market conditions for ethanol.	Continually invest in new processing and related technologies to lower energy use. Plan future expansions with an eye on the RFS and market capacity to maintain the premium for cellulosic ethanol.
Enzyme Costs	Significant enzyme cost reductions do not occur, delaying the rate of cellulosic ethanol capacity additions.	Expected enzyme cost reductions are achieved, further improving competitiveness of cellulosic ethanol production.	Continually work to lower cellulosic enzyme production costs.

1C Risk Mitigation

Risk Category	Potential Negative Outcome	Potential Positive Outcome	Risk Mitigation
Competition with New Fossil-Fuel Sources & Technologies	Competing sources to replace oil imports (e.g., oil production from shale oil, tar sands, or gas to-liquid fuel production from coal syngas or natural gas) supplant the demand for ethanol.	Environmental attributes of ethanol, competitive economics of integrated bio-refineries, and national security concerns (and resulting policies) create a strong and sustained demand for cellulosic ethanol.	Maintain aggressive R&D program to improve technology and lower production costs. We will also promote the positive aspects of cellulosic ethanol.
Lacking Farm Policy	US government continuing to not allow farmers to harvest switchgrass from CRP grounds.	Farm Bill allows switchgrass harvest from CRP lands, hastening availability of economic energy crops.	Secure enough biomass through non-energy crop sources.
Energy Crop Yields	Improvements in energy crop yields are delayed due to less than adequate R&D investment.	Improvements in energy crop yields are achieved and energy crops prove to be economically attractive.	Maintain long term contracts for agricultural residue feedstocks.
Ethanol Supply & Demand	Over-expansion of the starch-ethanol industry creates an oversupply.	Increased ethanol demand due to growing E85 demand, renewable fuel standards and incentives, and national security concerns creates strong need for cellulosic ethanol.	Abengoa Bioenergy is taking significant measures to mitigate this risk through other facilities that give access to the export marketplace.
Regulatory (permitting)	Delays or difficulties occur in obtaining air, water, construction, or other permits.	Abengoa's experience in obtaining these permits for its existing starch ethanol plants facilitates smooth permitting for new biorefineries.	Secure an environmental consultant to help mitigate the risk of the permitting process.
Ethanol Prices	Ethanol prices are volatile and are subject to a negative downward swing especially if market speculators overreact.	Ethanol prices are volatile and are subject to a positive upward swing especially if market speculators overreact.	Abengoa Bioenergy Trading enters into long term contracts based on a differential to RBOB prices. This allows the company to lock in revenue streams. Stable revenue from Power Generation insures ability to repay debt.

1C Risk Mitigation

Risk Category	Potential Negative Outcome	Potential Positive Outcome	Risk Mitigation
Ethanol Revenue	Revenue generated through the sales of cellulosic ethanol to meet expectations due to yield problems, operating costs or cost of biomass.	Revenue generated by cellulosic ethanol sales meets expectations as yields, operating costs, and input costs meet the plan.	ABBK revenue from power sales lower risk and intended to provide operating revenue protection for the project. Working with multiple supply companies. We are part of DSM's DOE enzyme development project and we have a favorable license to improve and produce Dyadic enzymes.
Feedstock property variation	Material doesn't perform or support the yields in the process	Feedstock is uniform or doesn't unexpectedly or uncontrollably impact the process.	Continue pilot and demonstration scale conversion studies and analysis studies with varying feedstocks and sources of feedstocks to determine best control practices.
Pretreatment Scale-up	Pilot performance is not reflected at production scale.	Production system meets the performance of the pilot plant and proforma.	Utilizing well know industrial equipment, vendors and experts that have scaled-up to our production scale with similar operations
Cofermentation yield	Organisms and equipment are not sufficient to achieve desired yields	Target yields are exceeded at commercial scale.	Continue to optimize the fermentations at large pilot scale with assistance from vendors. Continue to evaluate alternative fermentation systems. The equipment is flexible enough to accommodate different organisms and operating scenarios.
Installed process may not accommodate the variations in thin stillage	Water processing systems are overwhelmed with variations from the process and force a full process shutdown	Improved overall operation and proforma due to low operating cost and positive heat balance.	Continued vendor testing and system design optimization cost evaluation with representative pilot plant material.

ABBK Risk Mitigation Update

Major Work:

Refinery pilot plant at York, NE continued;

- Characterization of process waste water
- Generation of representative cake and syrup for combustion analysis
- Stillage dewatering testing

2011 to date Major Work with Vendors:

- Biomass Receiving – West Salem; Destringer, grind rate, dirt removal
- Screw Press – Vincent; Flocculent requirements, throughput, % solids of cake
- Filter Press – Andritz; Flocculent requirements, throughput, % solids of cake
- Burn Test Emissions Testing– Detroit Stoker
- Biothane – WWT treatability study
- Test at Chemineer
- Evaporator pilot testing with HPD (Horton Process Division)

ABBK Risk Mitigation Update

Environmental Permits:

- Characterization of process waste water completed
- Generation of representative cake and syrup for combustion analysis
- Stillage dewatering testing completed

Technical Validation

- Pilot scale and laboratory scale trials have been run in support of ABBK validation
- Installation of acid soak with recycle similar to what ABBK will operate; results has raise some concerns related to soluble sugars and extractables in the acid stream.
- Trials on ABBK blow cyclone operating conditions to confirm the COD, BOD, furfural, and organic loading information provided by the vendor. Results were slightly less than original dataset, but significantly different.

ABBK Risk Mitigation Update

Technical Engineering:

- Resolution of HAZOP action items
- MOCs submitted for EH Propagation Enhancement
  - Dry yeast/vitamin storage/dosing and sterilize glucose skids
- Commissioning of Cogeneration Systems
  - DCS site acceptance testing
  - Pipe system cleaning
  - CW piping passivation
  - Boiler boil-out
  - Steam blow

Feedstock:

- Joint Venture established with Pacific Ag
- Plan for biomass storage area west of the ABBK Plant is completed
- Biomass trailers have been selected
- Additional satellite storage facilities obtained

ABBK Risk Mitigation Update

Utility Supply:

- Electrical supply – Started Q3 2013
- Natural Gas supply – Started Q4 2013
- Well water – All rights executed. First well available July 15, 2013

Land:

- Land acquisition – All land for the facility has been purchased.
- Land easements – All land easements and right-of-way have been acquired.

ABBK Risk Mitigation Update

Cost overrun mitigation:

- Implemented and managed a robust Management of Change (MOC) program.
- Strong justifications and management approval required for all changes.
- Cost/benefit analysis.
- Strong owner review of EPC contractor detailed design documents and vendor submittals.

Schedule slip mitigation:

- Early long lead equipment purchases.
- Continuous earned value tracking.
- Close tracking of subcontractors that are in the critical path (Boiler, pretreatment)
- Early detection of errors (vendor submittals)

1. Company Structure and Project Management

1D EPC Contract Issues

Final design and construction

Contract type:

- Lump sum EPC contract for final design, procurement services and construction through site reception
- Abeinsa EPC LTD – Subcontracted final design. Self performs procurement services. Acts as a General Contractor for construction. All construction performed by subcontractors
- Multiple Abengoa company subcontractors

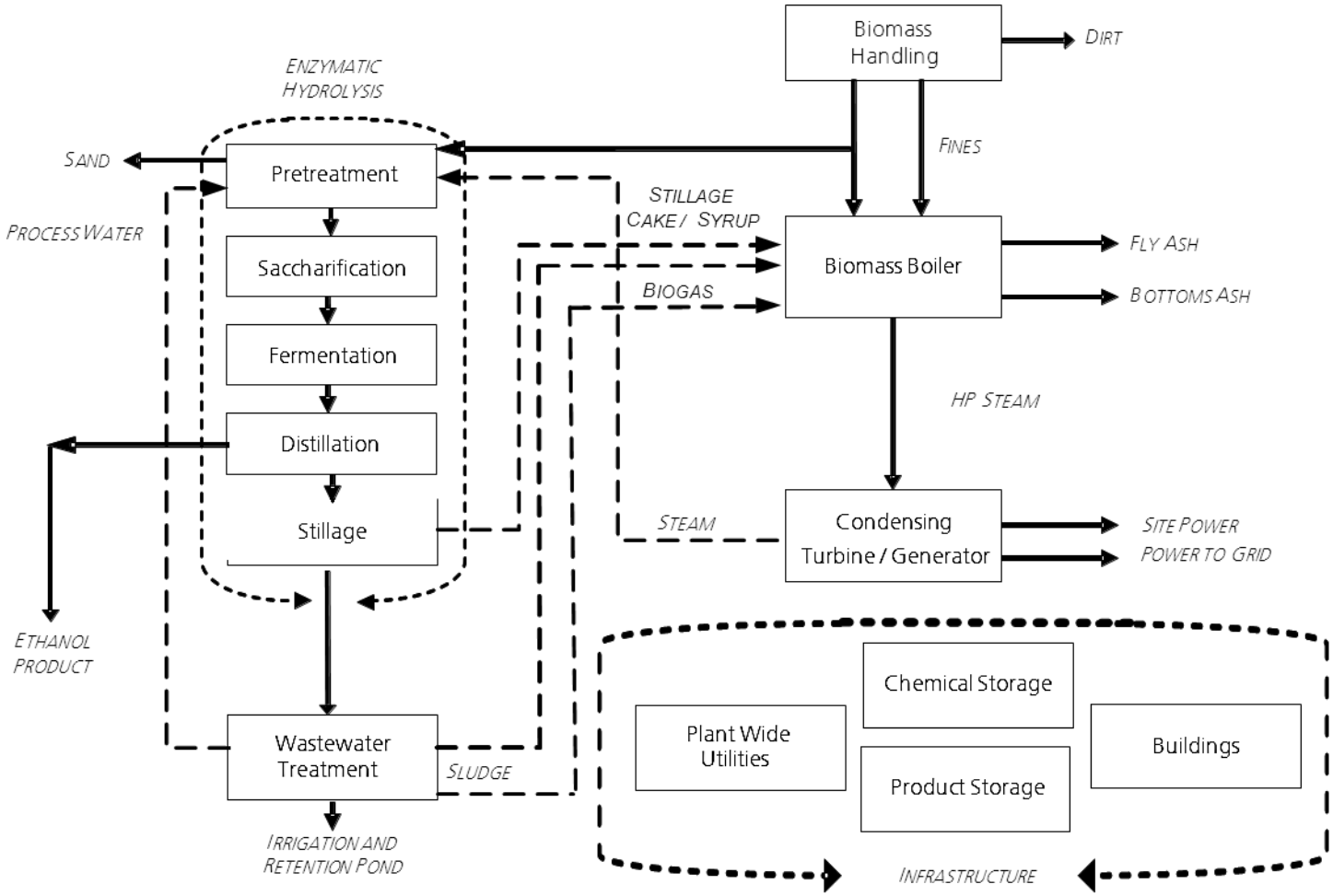
Contract issues:

- At times contractor would build to what was bid and not specified.
- Safety in general has been acceptable but at times has required owner involvement
- At time Contractor depends on subcontractors for full quality checks.
- Additional cost changes.

2 – Technical Performance

2A Process Operations and Technical Targets

2A Process Operations and Technical Targets



Abengoa Bioenergy Biomass of Kansas

Social and Environmental

Land Use	▪ The reduction in farmland at the site of the biorefinery is expected to have little, if any, impact on land use and farm support services. ▪ The removal of crop residues from areas within a 50-mile radius of site is expected to have a beneficial to minor adverse effect on soil organic matter content.
Air Quality	▪ Impacts less than levels deemed to be protective of human health and the environment ▪ Would not degrade existing air quality
Hydrology (surface and ground water)	▪ Potential impacts to runoff and infiltration of surface waters would be minor, and no jurisdictional wetlands would be affected. ▪ Rates of withdrawal of groundwater would be less than currently used for irrigation.
Biological resources	▪ No direct or indirect impacts on flora or fauna are expected. ▪ No impact on endangered, candidate, or protected species is expected.
Utilities, Energy and Materials	▪ Additional water, sewage, and solid waste needs of increased population are within the current capabilities of Hugoton and Stevens County. ▪ Electrical power will not be required, but will be produced and supplied to the grid by the biorefinery. The biorefinery will be a net producer, not consumer of vehicle fuels.
Wastes, Byproducts and Hazardous Materials	▪ There is adequate landfill capacity within the region of influence for construction and demolition wastes. ▪ Land application of outfall non-contact, excess waste water effluent and sludge does not have adverse effects. ▪ Genetically modified organisms used in ethanol production will be contained, killed, and burned for fuel in the biomass boiler system.

Social and Environmental

Transportation	▪ It is estimated that over the construction phase and 30 year operations phase of the biorefinery, there will be approximately one traffic fatality per year associated with the shipment of raw materials, products, and wastes.
Aesthetics	▪ Structures erected for the biorefinery would be similar to existing grain elevator and other local structures, but lit for round-the-clock operation. ▪ No hearing loss is expected for workers using mandated hearing protection during construction or operation. ▪ Modeling analysis indicates that odorous emissions from the biorefinery would not be detectable offsite.
Socioeconomics	▪ Socioeconomic impacts are expected to be less than one percent of the baseline for the region.
Cultural Resources	▪ Neither construction nor operation of the biorefinery would adversely affect State or National Historic Register sites.
Health and Safety	▪ Construction is expected to involve 14 total recordable cases and 7.0 days away from work cases. ▪ Operations is expected to involve an annual 2.7 total recordable cases and 0.94 days away from work cases.
Environmental Justice	▪ Onsite industrial accidents would not be expected to impact members of the community. ▪ Increased traffic accidents related to increased traffic for minority and low-income populations are not expected to exceed those of the general population.

Energy, Water and Green House Gas Reduction

Feedstock, energy and water demand	▪ The chosen feedstock, corn stover, does not require irrigation beyond that of the grain it is cultivated to produce.
Facility water demand	▪ Water consumption is 13 gallon per gallon denatured fuel produced.
Energy sources	▪ Electrical Power from ABBK cogeneration plant ▪ Heat Energy from ABBK cogeneration plant ▪ Natural gas system to facilitate biomass boiler start-up ▪ Biomass feedstock for conversion to biofuel and electrical power ▪ Fossil-based fuel for raw material supply and product shipping

Estimated Energy demand per gallon of biofuel produced	
Electrical (Kw / gallon)	▪ 4.9 KwHr/gal [EH only]
Heat (Btu / gallon)	▪ 53,268 BTU/gal [EH only]

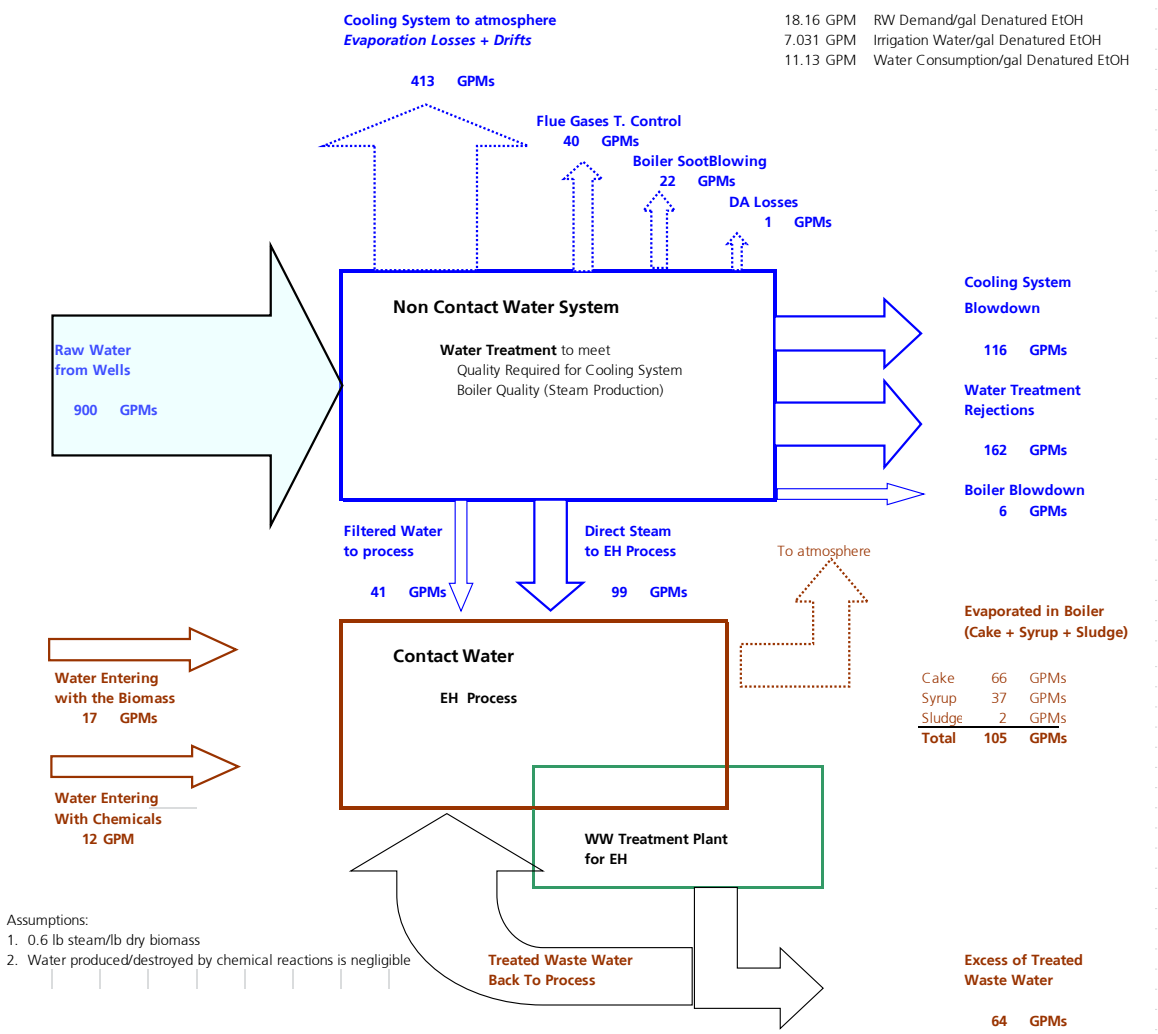
Green house gas reduction – Per the Argonne Greet model	
% Reduction	▪ 70% @ 19MW electrical site consumption and zero power to the grid ▪ 83% @ 16MW electrical site consumption and 5MW to the grid

Energy and Water

Estimated Water Consumption per gallon of biofuel produced	
Gross Amount (Wells)	▪ 18.2 gallons water / gallon of ethanol
Evaporative Cooling	▪ 8.3 gallons water / gallon of ethanol
Blow-Down/Reject	▪ 5.7 gallons water / gallon of ethanol
WWT Disposal	▪ 1.3 gallons water / gallon of ethanol
Wet Cake/Syrup Disposal	▪ 2.1 gallons water / gallon of ethanol
Miscellaneous Losses	▪ 0.8 gallons water / gallon of ethanol

Sum of individual uses is greater than well water because there is water input from raw materials and chemicals.

Water Balance Diagram



Permitting Status

#	Permit	Status (Submitted, Received)	Responsible Party (AB=Abengoa Bioenergy, A/T=Abener/Teyma)	Issuing Agency	Needed Prior to Construction	Description of Steps to Obtain
1	Zoning Permit (Zoning change from Ag to Heavy Industrial)	Rec	AB	Stevens County	X	Complete
2	Special Use Permit (Required for Industrial Operations)	Rec	AB	Stevens County	X	Complete
3	Endangered Species Compliance (Compliance with Endangered Species)	Rec	AB	FWS	X	Complete
4	Archaeological /Historical Compliance (Compliance with State historical/archaeological sites)	Rec	AB	KSHPO	X	Complete
5	USACE 404/KDNR Wetlands Permit (Jurisdictional wetland/stream disturbances)	Rec	AB	USACE	X	Complete
6	NEPA/EIS	Rec	AB	DOE	X	Complete
7	Air Construction Permit	Rec	AB	KDHE/EPA	X	Complete
8	Construction SWPPP/NPDES	Rec	A/T	KDHE	X	Complete
9	FAA Form 7460	Rec	AB	FAA		Update approved.
10	NPDES - wastewater	Rec	AB	KDHE/EPA		Complete, Issued 7/10/12, monitoring plan approved. 1.

Permitting Status

#	Permit	Status (Submitted, Received)	Responsible Party (AB=Abengoa Bioenergy, A/T=Abener/Teyma)	Issuing Agency	Needed Prior to Construction	Description of Steps to Obtain
11	Railroad Interconnection Agreement	Sub	AB	CVRR/BNSF		Complete
12	Natural Gas Supply Agreement	Sub	AB	TBD - BHE		Complete
13	Water Rights Conversion Permit	Sub for 3 of 5	AB	KWA		Complete. 3 Converted to Industrial, 2 will remain agricultural.
14	Alcohol Fuel Producer's Permit		AB	US Alcohol & Tobacco Tax and Trade Bureau		Prior to commencing operations
15	Risk Management Plan		AB	KDHE/EPA		Prior to commencing operations
16	Process Safety Management		AB	OSHA		Prior to commencing operations, PHA complete, working on final report. Still need to create procedural documents
17	Emergency Planning & Community Right to know program		AB	KDHE/EPA/ Stevens County/ Hugoton Fire Dept.		Prior to commencing operations
18	Class I (Title V) Operating Permit		AB	KDHE		Prior to commencing operations
19	GMO MCAN	Rec	AB	EPA		All 3 approved.
20	Existing Natural Gas Facility Conflict Permits	Rec	A/T	Anadarko/Merit		Complete

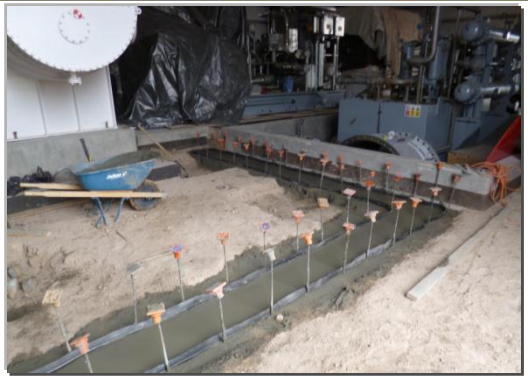
Permitting Status

#	Permit	Status (Submitted, Received)	Responsible Party (AB=Abengoa Bioenergy, A/T=Abener/Teyma)	Issuing Agency	Needed Prior to Construction	Description of Steps to Obtain
21	ROW/Road Construction Permit		A/T	Stevens County Highway Dept.		Verbal notification needed prior to apron work at county road. Same day permit to running water, gas, and non-contact water under county roads.
22	Sewer Septic System Permit	Rec	A/T	Stevens County/KDHE		Complete, County inspected the installation
23	Storage Tank Construction & Fire Prevention /Mitigation Plan		A/T	State of Kansas Fire Marshals Office		Complete
24	Plumbing Permit	Rec	A/T	City of Hugoton PWSD		Complete, the City of Hugoton installed potable water connection, back flow preventer, and meters at the construction site.
25	Fire Marshal Permitting	Rec	A/T	State of Kansas Fire Marshal's Office		Complete - Issued by State 4/24/12
26	Above Ground Storage Tanks		A/T	KDHE		Complete(same as #23)
27	NPDES Hydrostatic Testing Discharge Permit	Rec	A/T	KDHE		Complete - Issued by State 11/29/12
28	Dewatering/Hydrostatic Testing temp Water Rights		A/T	KDA - Water Division		Complete

Permitting Status

#	Permit	Status (Submitted, Received)	Responsible Party (AB=Abengoa Bioenergy, A/T=Abener/Teyma)	Issuing Agency	Needed Prior to Construction	Description of Steps to Obtain
29	Boiler Operations Permit		AB	KDHE		Complete
30	Pressure Vessel Code & Installation Compliance		A/T	State of Kansas		Complete
31	OSHA Personnel Protection/Prevention/ Safety Plan Permits		AB	OSHA		Complete
32	Permit from Nuclear Regulatory Commission to have radioactive instrumentation	Rec	A/T	NRC		Complete - License Issued 1/28/13
33	Back flow preventer inspection, potable water lines commissioning		A/T	EPA		Complete
34	Post Construction Septic System Notification		A/T	Kansas Dept. of Geology		Complete
35	Air Permit - Operating	Rec	AB	KDHE		Complete - Revised Permit Issued 1/22/13 Modified air permit to be issued 5/24/14

2 – Technical Performance



2B Feedstock Supply

Primary Feedstock Description

Corn Stover & Wheat Straw	▪ Initially 100% of ABBK biomass feedstock ▪ 930 DTPD for EH Plant and 100 to 157 DTPD for Co-Gen Plant ▪ Delivered to the plant via truck in 1100 pound bales at 15% moisture content ▪ Heating Value is 7,680 BTU's/LB ▪ Source of supply will be from local farms within a 50 mile radius of the plant
Warm season grasses and other energy crops	▪ 5 year plan is to begin the use of grasses; ▪ Delivered to the plant via truck in 1100 pound bales at 12% moisture content; ▪ Heating Value is 7900 BTU's/LB.
Chipped Wood Residues	▪ Potential in the future to replace cake ▪ Would be delivered to the plant via rail at 20% moisture ▪ Heating Value is 8500 BTU's/LB ▪ Source of supply will be primarily from chipped pallet plants in Kansas and Colorado

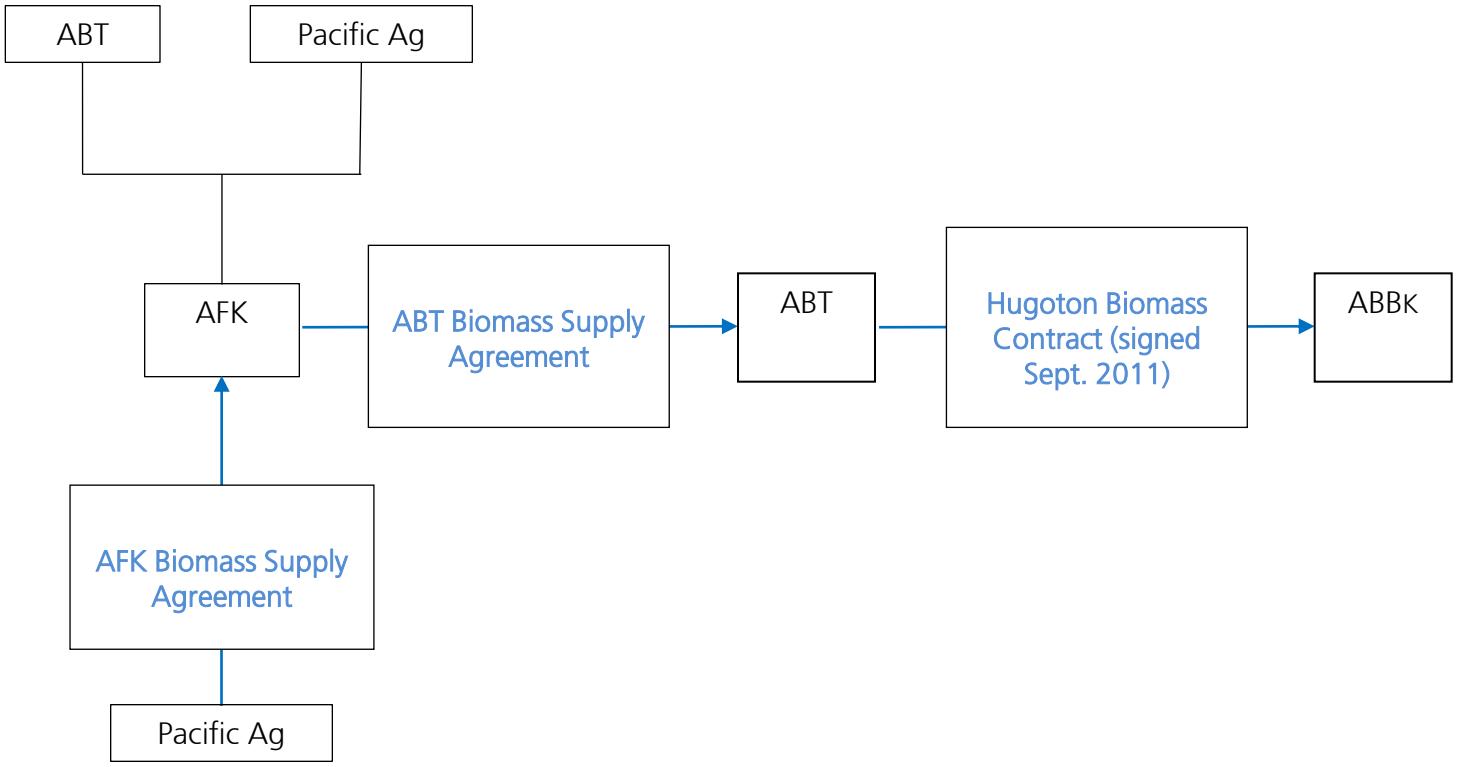
Feedstock Flexibility

Primary feedstocks	▪ Corn stover and wheat straw (biorefinery and cogeneration) ▪ Wood chips (cogeneration) – Future alternate
Auxiliary feedstocks	▪ Stillage cake, syrup, biogas (cogeneration) ▪ Fines removal dust (cogeneration)
Alternate feedstocks	▪ Warm season grasses and energy crops (biorefinery and cogeneration) ▪ Wood chips (biorefinery)
Future feedstocks	▪ Warm season grasses. Will utilize in irrigation system, plant in 2014
Alternate feedstock research	▪ Feedstock preparation, Pretreatment, saccharification, fermentation of wheat straw (pilot and demonstration plant), switchgrass (pilot plant)

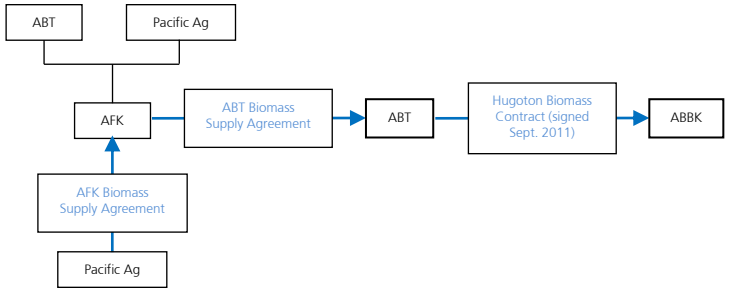
Feedstock Specification

Biorefinery Feedstock Specification	
Material Specifications	▪ Corn Stover ▪Moisture – Not to exceed 15% ▪Impurities < 0.5% ▪Size – 1.25 inch minus (Nominal) ▪Fines – limited to 10% ▪Foreign Matter – Free of debris, rocks or tramp metal ▪Ash – maximum of 15% initially, 13% year 2, 10% year 3. [Will not pay for any ash over 8%, will dock for ash % over a value set each year]
Sampling	▪ Feedstock will be sampled upon arrival at plant gate; ▪ Off-spec material will be rejected.

Existing Structure

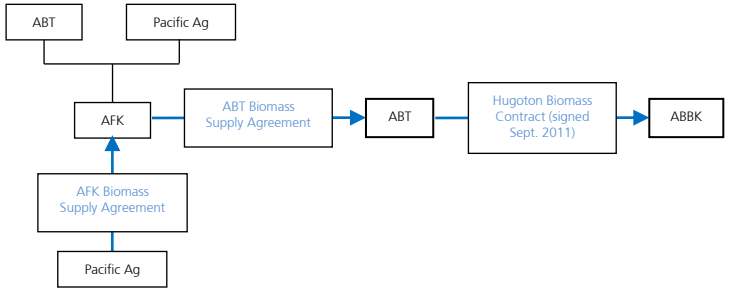


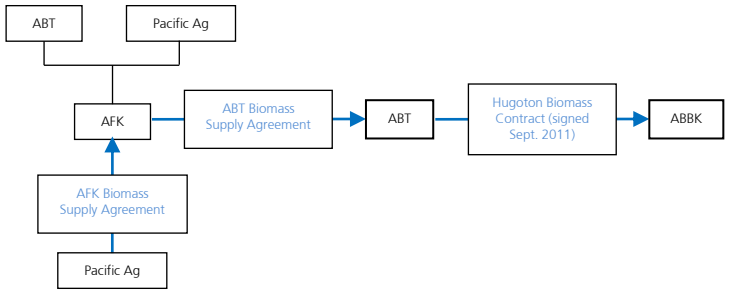
2B Feedstock Supply



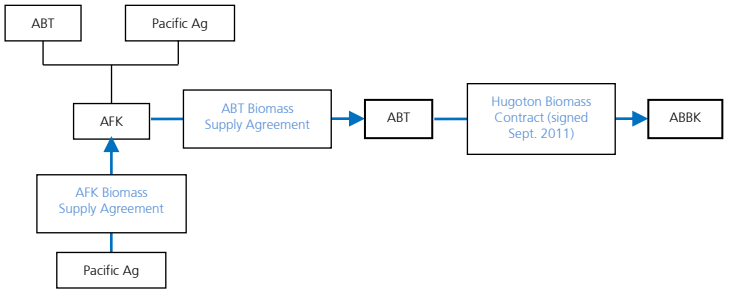
- **Advanced Feedstocks of Kansas (“AFK”) Ownership:**
  - **Abengoa Bioenergy Trading (“ABT”) 51%.**
  - **Pacific Ag 49%.**
- **Agreements**
  - **ABT Biomass Supply Agreement.**
  - **AFK Biomass Supply Agreement.**

- AFK Goals and Objectives
  - Provide all biomass for ABBK.
  - Create and manage market.
  - Implement Pacific Ag's proven strategies to source biomass
  - Innovate existing technologies to lower CHST costs
  - Pacific Ag non-compete w/in 100 miles of the ABBK Facility.
  - AFK will manage existing ABBK feedstock contracts.
  - AFK to develop and implement cost reduction strategies to lower biomass supply costs.
  - 10-Year terms.





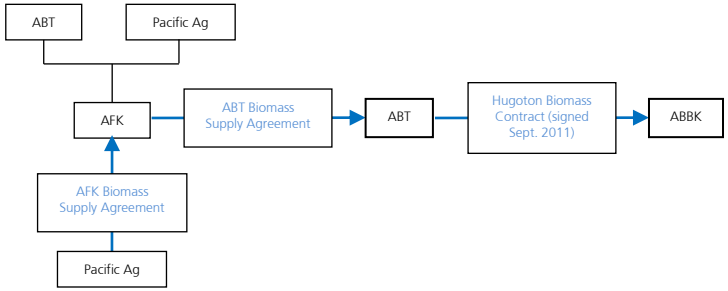
- **ABT Biomass Supply Agreement. b/w ABT and AFK**
  - **AFK supplies 100% of biomass for ABBK Facility.**
  - **Product Price.**
    - **Biomass: $15 per dry ton.**
    - **CHST: Actual direct costs.**
  - **ABT audit right.**



- **AFK Biomass Supply Agr.**

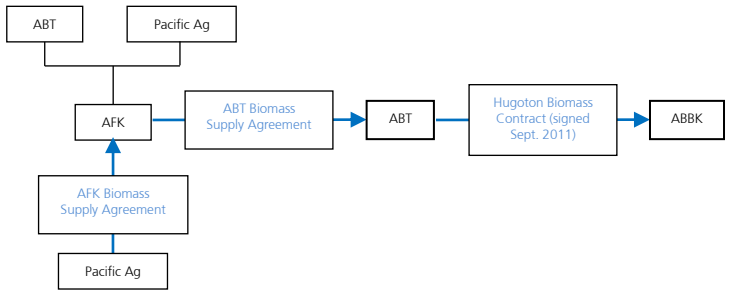
  b/w AFK and Pacific Ag

  - **Pacific Ag will supply AFK w/ 100% of biomass for the ABBK Facility.**
  - **AFK must purchase a minimum of 200Kdtons.**
  - **Pacific Ag shall meet specifications.**



- **AFK Biomass Supply Agreement b/w AFK and Pacific Ag**
  - **Biomass Price: price to farmers for biomass and storage**
  - **CHS Price: price of collection, harvesting, and storage.**
  - **Service Fee: price per dry ton of delivered biomass.**
  - **Transportation Price is actual cost to deliver biomass.**
  - **Biomass and CHS Price Incentive Models for cost reductions.**

- **AFK Biomass Inventories**
  - **Total Inventory: 110K dry tons.**
  - **2013 Harvest: 90K dry tons.**
  - **2014 Harvest: 330K dry tons.**



Consumption Forecast

Term	ABBK Use	Harvest	Closing In-ventory	Min. DOE Inv. Delta
Feb-14	210	28,000	104,000	
Mar-14	1,470	10,000	112,530	
Apr-14	1,050	6,000	117,480	
May-14	8,020	14,000	123,460	
Jun-14	21,500	12,000	113,960	
Jul-14	25,000	35,000	123,960	
Aug-14	27,000	12,000	108,960	
Sep-14	27,000	0	81,960	18,960
Oct-14	27,000	35,000	89,960	57,960
Nov-14	27,000	95,000	157,960	39,960
Dec-14	25,000	71,000	203,960	60,960
Jan-15	27,000	24,000	200,960	32,960
Total	**217,250**	**430,430**		
Delta		**213,180**		

Satellite Storage:

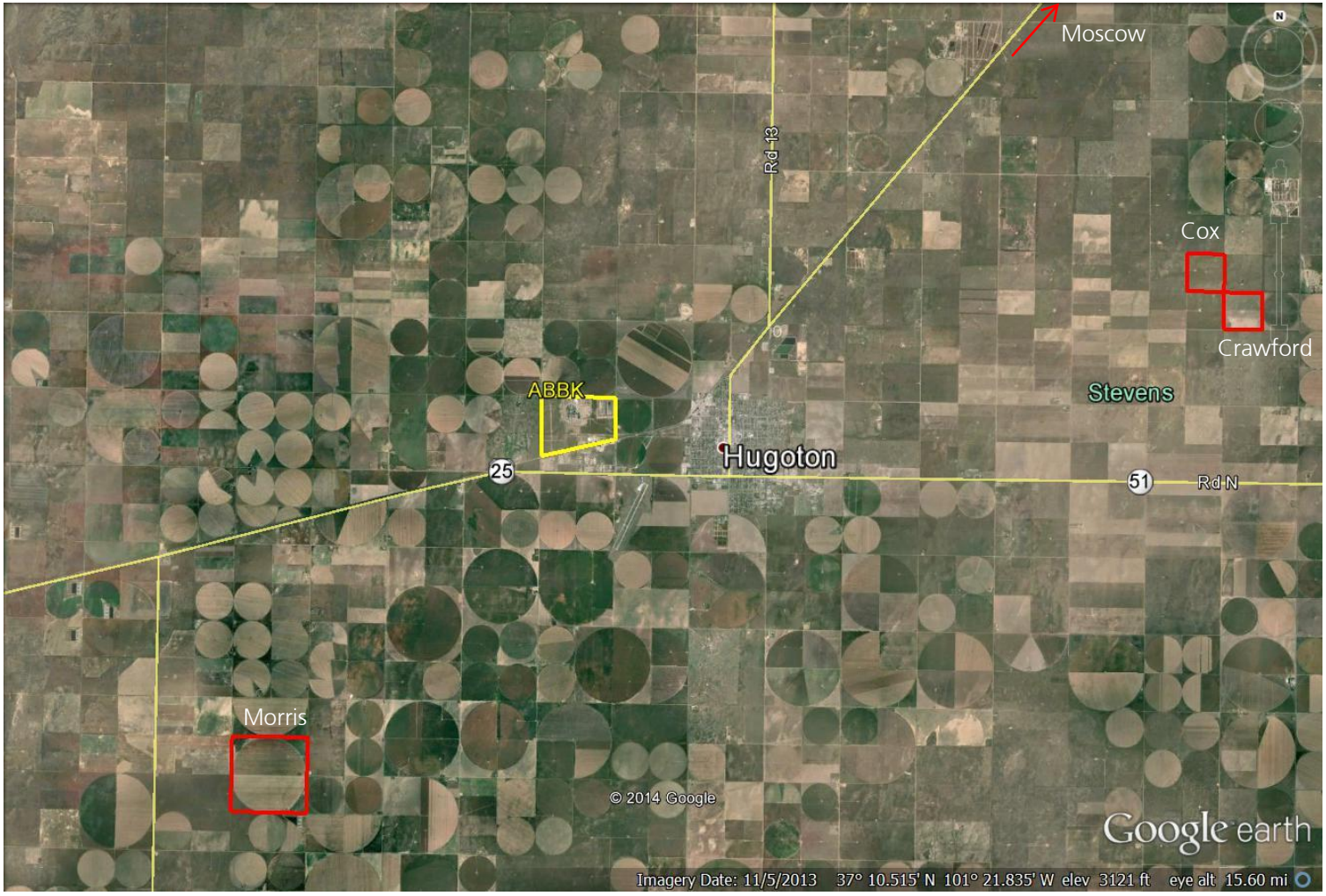
Morris

Cox

Crawford

Moscow

Satellite Storage Locations



Crawford Storage Site

3 – Financial Health and Marketing

3A Marketing Approval and Commercialization Plans

Off-Take Agreements

Energy Purchase Agreement	▪ Energy purchase agreement completed. ▪ Power sales currently not in Proforma. ▪ Current wholesale price is 5.5 to 6 cents per KW-Hr ▪ Avoided cost is approximately 2.0 to 3 cents per KW-Hr ▪ Potential for future green energy sales.
Ethanol Agreement	▪ Ethanol agreement with Abengoa Bioenergy Trading completed, 100% offtake. ▪ Market price.

3 – Financial Health and Marketing

3B Project Financing

Project Costs

Uses	
EPC EH	317.7
EPC Cogen	127.0
Start-Up & Development Costs	37.1
Others (Engineering, Mkt Trading Dev…)	34.0
Land & Water Rights	8.6
Legal & Due Diligence Consulting Fees	4.3
Essential Tools & Spare Parts	2.8
Initial Stocks	15.0
Financial Costs	4.4
DSRA	19.9
SLRA	4.5
Total Uses	**575.1**

Sources	
DOE 932 Award	97.5
US Treasury 1603 Grant	30.0
DOE Loan Guarantee	104.3
Equity	343.4
Total Sources	**575.1**

In MM $

Equity Sourcing

- ✓ Parent company Owner's Equity
- ✓ Parent guarantee apart of Loan Guarantee Agreement
- ✓ Provide sufficient support to ensure the successful completion and commercialization of the Project
- ✓ Furthermore, equity should mitigate any potential risks that the Project could encounter

Borrower's Parent company, Abengoa SA is a strong financial company

Strong Business and Financial Performance

1 Excellent business performance in all our segments…

Revenues	7,356 M€ ⬆+17% YoY
EBITDA	1,365 M€ ⬆+44% YoY
Net Income	101 M€ ⬆+84% YoY
E&C Backlog	6.8 B€ ⬆ +2% YoY
E&C Pipeline	139.0 B€ ⬆+58% YoY

2 …achieving deleveraging targets …

Corporate Net Debt	2,124 M€ ⬇-15% vs Dec'12
Corporate EBITDA	978 M€ ⬆+48% YoY
Corporate Leverage	2.2x ⬇-1.5x vs Dec'12
Corporate CAPEX	729 M€ ⬇ -39% YoY

3 … and reinforcing the balance sheet

Capital Increase	517 M€ To accelerate credit rating
Asset Rotation	+800 M€ cash collected in 2013
Debt Capital Markets	~1,300 M€ raised to extend maturities
Reducing Cost	7.75% Coupon of latest HY Bond issued

Borrower's Parent company, Abengoa SA Cash Flow Overview

Cash generated from operation & ending the year below Corp. Net CAPEX target of 750 M€

	FY 2013	FY 2012
• EBITDA	1,365	949
• Working Capital	228	178
• Net Interest Paid	(509)	(397)
• Taxes & Other Financial Cost	(223)	(174)
• Non-monetary Adjust.	(156)	(39)
• Discontinued operations:	35	85
Cash generated from operations	**741 M€**	602
• Total CAPEX invested	(2,257)	(2,731)
• Other net investments	395	448
• Discontinued operations	(25)	(355)
Net Investment	**(1,887) M€**	(2,638) M€
of which ABG's Corp CAPEX:	729 M€	1,189 M€
• Proceeds from loans & borrowings	3,282	757
• Repay of loans & borrowings & other activities	(1,802)	(230)
• Capital Increase	517	-
• Others	(111)	318
Net CF from financing activities	**1,886 M€**	845 M€
Cash as of December…	**2,952 M€** (120) M€ FX (81) M€ Disc. Op	2,413 M€

3 – Financial Health and Marketing

3C Project Economics

3C – Project Economics
10 year Proforma Income Statement

P&L	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Revenues												
Ethanol Commodity	11,307	45,565	47,414	50,089	52,710	54,992	57,659	60,012	62,293	64,119	67,158	68,829
Basis Capture	960	3,851	4,171	4,268	4,564	4,564	4,805	4,792	5,020	5,020	5,345	5,330
Transportation Cost	-1,173	-4,920	-5,049	-5,391	-5,476	-5,705	-5,720	-5,933	-6,161	-6,161	-6,507	-6,721
Rail Car Lease Cost	-267	-1,070	-1,098	-1,123	-1,141	-1,141	-1,144	-1,141	-1,369	-1,369	-1,394	-1,390
Advanced RIN Value	3,147	14,119	14,927	15,499	15,288	14,832	13,957	13,235	12,778	12,778	12,781	12,978
Cellulosic Waiver Credit	2,933	13,905	15,805	16,622	16,657	15,745	14,644	13,006	11,865	0	0	0
Netback Ethanol Revenues before Other Expense	16,907	71,449	76,170	79,963	82,602	83,286	84,201	83,971	84,427	74,387	77,383	79,026
Floor Price Support	693	0	0	0	0	0	0	0	0	0	0	0
Ethanol Revenues	17,600	71,449	76,170	79,963	82,602	83,286	84,201	83,971	84,427	74,387	77,383	79,026
Ash	0	0	0	0	0	0	0	0	0	0	0	0
Electricity	0	0	0	0	0	0	0	0	0	0	0	0
Total Revenues	**17,600**	**71,449**	**76,170**	**79,963**	**82,602**	**83,286**	**84,201**	**83,971**	**84,427**	**74,387**	**77,383**	**79,026**
COGS												
Variable Costs												
Biomass Cost	5,363	21,065	21,434	21,775	22,341	22,527	22,836	22,984	23,183	23,420	24,065	24,250
Cellulase Enzyme	1,877	7,528	7,725	7,904	8,030	8,030	8,052	8,030	8,030	8,030	8,178	8,155
Denaturant	279	1,154	1,220	1,286	1,345	1,385	1,431	1,470	1,514	1,559	1,636	1,680
Other Chemical & Utilities	2,607	10,710	11,232	11,773	12,254	12,561	12,910	13,199	13,530	13,869	14,470	14,794
Total Variable Costs	**10,127**	**40,457**	**41,610**	**42,738**	**43,970**	**44,503**	**45,229**	**45,682**	**46,257**	**46,878**	**48,348**	**48,879**
FIXED COSTS												
Personnel - Production	1,151	4,704	4,734	4,744	4,863	4,985	5,109	5,237	5,368	5,502	5,640	5,780
Maintenance	526	2,156	2,213	2,268	2,325	2,383	2,442	2,503	2,566	2,630	2,696	2,763
Total Fixed Costs	**1,677**	**6,860**	**6,946**	**7,012**	**7,188**	**7,367**	**7,551**	**7,740**	**7,934**	**8,132**	**8,335**	**8,544**
SG&A												
Insurance	244	1,000	1,025	1,051	1,077	1,104	1,131	1,160	1,189	1,218	1,249	1,280
Other General Expenses	244	1,000	1,025	1,051	1,077	1,104	1,131	1,160	1,189	1,218	1,249	1,280
Corporate Services Fee (Abengoa)	306	1,277	1,338	1,391	1,432	1,454	1,478	1,492	1,513	1,429	1,476	1,510
Management Fee (Bioenergía)	0	0	0	0	0	0	0	0	0	0	0	0
Total General Expenses	**794**	**3,277**	**3,388**	**3,492**	**3,586**	**3,661**	**3,741**	**3,811**	**3,890**	**3,866**	**3,974**	**4,070**
Total SG&As	**794**	**3,277**	**3,388**	**3,492**	**3,586**	**3,661**	**3,741**	**3,811**	**3,890**	**3,866**	**3,974**	**4,070**
EBITDA	**5,002**	**20,855**	**24,225**	**26,721**	**27,859**	**27,754**	**27,679**	**26,737**	**26,346**	**15,511**	**16,725**	**17,532**
Depreciation & Amortization (Book Dep)	-5,372	-21,488	-21,488	-21,488	-21,488	-21,488	-21,488	-21,488	-21,488	-21,488	-22,051	-23,740
EBIT	**-370**	**-633**	**2,737**	**5,233**	**6,371**	**6,266**	**6,191**	**5,249**	**4,858**	**-5,977**	**-5,326**	**-6,208**
Interest Income	7	132	179	197	214	168	0	0	0	0	0	0
Interest Expense	0	2,327	2,820	2,398	1,931	1,138	0	0	0	0	0	0
EBT	**-363**	**-2,828**	**96**	**3,032**	**4,654**	**5,296**	**6,191**	**5,249**	**4,858**	**-5,977**	**-5,326**	**-6,208**
Taxes	-144	-1,119	38	1,199	1,841	2,095	2,448	2,076	1,921	-2,364	-2,636	-2,998
Net Income	**-219**	**-1,710**	**58**	**1,833**	**2,813**	**3,202**	**3,742**	**3,173**	**2,937**	**-3,613**	**-2,690**	**-3,210**

3C – Project Economics
Envisioned first commercial case

Imput Assumptions - First Year	
Nameplate Ethanol Production (gal/year)	25,000,000
Nameplate Electricity generation (MW/year)	21
Ethanol yield (gal/ton)	75
Stream Days	300
Ethanol price ($/gal)	2.84
Cellulosic Ethanol Premium ($/gallon)	0.65
Ethanol Denatured by Volume (%)	2.25%
Daily Biomass Usage Plant (dton/day)	930
Daily Biomass Usage Cogen (dton/day)	72
Biomass Dry Matter Loss (%)	5.00%
Biomass Price ($/dton)	63.00
Less: ABT Sellers Fee ($/dton)	1.00
Enzymes cost ($/gal)	0.40
Natural Gas Consumption (Btu/gal)	881
Natural Gas Use - Annual Supplemental Firing (MM	30,000
Natural Gas Cost Price ($/MMBTU)	6.00
Electricity Cost Price /$/Kwh)	0.074
Sewage and water - Price per gal ethanol	0.01
Personel - Production Employees (people)	67
Cost per person ($/year per person)	68,420
Routine Maintenance ($/yr)	700,000
Major Maintenance Capex for Ethanol Plant ($/yr)	700,000
Major Maintenance Capex for Cogen Unit ($/yr)	750,000
Sales & Marketing Fee (% on Sales)	1.00%
Freight - fuel grade ethanol ($/gal)	0.13
Rolling Equipment Lease Cost ($/gal)	0.023
Insurance	1,000,000
General and Lease Expenses	1,000,000
Corporate Management Services (Fee Abengoa)	1.00%
Management Fee (% Sales) (Fee Bioenergía)	1.00%

Imput Assumptions - Second Year	
Nameplate Ethanol Production (gal/year)	25,000,000
Nameplate Electricity generation (MW/year)	21
Ethanol yield (gal/ton)	75
Stream Days	307
Ethanol price ($/gal)	2.84
Cellulosic Ethanol Premium ($/gallon)	0.58
Ethanol Denatured by Volume (%)	2.32%
Daily Biomass Usage Plant (dton/day)	930
Daily Biomass Usage Cogen (dton/day)	72
Biomass Dry Matter Loss (%)	5.00%
Biomass Price ($/dton)	64.06
Less: ABT Sellers Fee ($/dton)	1.00
Enzymes cost ($/gal)	0.40
Natural Gas Consumption (Btu/gal)	881
Natural Gas Use - Annual Supplemental Firing (MM	30,000
Natural Gas Cost Price ($/MMBTU)	6.00
Electricity Cost Price /$/Kwh)	0.076
Sewage and water - Price per gal ethanol	0.01
Personel - Production Employees (people)	67
Cost per person ($/year per person)	68,420
Routine Maintenance ($/yr)	768,750
Major Maintenance Capex for Ethanol Plant ($/yr)	717,500
Major Maintenance Capex for Cogen Unit ($/yr)	768,750
Sales & Marketing Fee (% on Sales)	1.00%
Freight - fuel grade ethanol ($/gal)	0.13
Rolling Equipment Lease Cost ($/gal)	0.023
Insurance	1,025,000
General and Lease Expenses	1,025,000
Corporate Management Services (Fee Abengoa)	1.00%
Management Fee (% Sales) (Fee Bioenergía)	1.00%

✓ We have demonstrated and exceeded our commercial targets at the pilot scale

3C – Project Economics
10 year Proforma Income Statement ($/Gal)

P&L	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Revenues												
Ethanol Commodity	2.169	2.179	2.210	2.281	2.363	2.465	2.578	2.691	2.793	2.875	2.957	3.038
Basis Capture	0.184	0.184	0.194	0.194	0.205	0.205	0.215	0.215	0.225	0.225	0.235	0.235
Transportation Cost	-0.225	-0.235	-0.235	-0.246	-0.246	-0.256	-0.256	-0.266	-0.276	-0.276	-0.286	-0.297
Rail Car Lease Cost	-0.051	-0.051	-0.051	-0.051	-0.051	-0.051	-0.051	-0.051	-0.061	-0.061	-0.061	-0.061
Advanced RIN Value	0.604	0.675	0.696	0.706	0.685	0.665	0.624	0.593	0.573	0.573	0.563	0.573
Cellulosic Waiver Credit	0.563	0.665	0.737	0.757	0.747	0.706	0.655	0.583	0.532	0.000	0.000	0.000
Netback Ethanol Revenues before Other Expense	3.243	3.417	3.550	3.642	3.703	3.734	3.765	3.765	3.785	3.335	3.407	3.488
Floor Price Support	0.133	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Ethanol Revenues	3.376	3.417	3.550	3.642	3.703	3.734	3.765	3.765	3.785	3.335	3.407	3.488
Ash	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Electricity	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Revenues	**3.376**	**3.417**	**3.550**	**3.642**	**3.703**	**3.734**	**3.765**	**3.765**	**3.785**	**3.335**	**3.407**	**3.488**
COGS												
Variable Costs												
Biomass Cost	1.029	1.007	0.999	0.992	1.002	1.010	1.021	1.030	1.039	1.050	1.059	1.070
Cellulase Enzyme	0.360	0.360	0.360	0.360	0.360	0.360	0.360	0.360	0.360	0.360	0.360	0.360
Denaturant	0.054	0.055	0.057	0.059	0.060	0.062	0.064	0.066	0.068	0.070	0.072	0.074
Other Chemical & Utilities	0.500	0.512	0.523	0.536	0.549	0.563	0.577	0.592	0.607	0.622	0.637	0.653
Total Variable Costs	**1.942**	**1.935**	**1.939**	**1.947**	**1.971**	**1.995**	**2.022**	**2.048**	**2.074**	**2.102**	**2.128**	**2.158**
FIXED COSTS												
Personnel - Production	0.221	0.225	0.221	0.216	0.218	0.223	0.228	0.235	0.241	0.247	0.248	0.255
Maintenance	0.101	0.103	0.103	0.103	0.104	0.107	0.109	0.112	0.115	0.118	0.119	0.122
Total Fixed Costs	**0.322**	**0.328**	**0.324**	**0.319**	**0.322**	**0.330**	**0.338**	**0.347**	**0.356**	**0.365**	**0.367**	**0.377**
SG&A												
Insurance	0.047	0.048	0.048	0.048	0.048	0.049	0.051	0.052	0.053	0.055	0.055	0.057
Other General Expenses	0.047	0.048	0.048	0.048	0.048	0.049	0.051	0.052	0.053	0.055	0.055	0.057
Corporate Services Fee (Abengoa)	0.059	0.061	0.062	0.063	0.064	0.065	0.066	0.067	0.068	0.064	0.065	0.067
Management Fee (Bioenergía)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total General Expenses	**0.152**	**0.157**	**0.158**	**0.159**	**0.161**	**0.164**	**0.167**	**0.171**	**0.174**	**0.173**	**0.175**	**0.180**
Total SG&As	**0.152**	**0.157**	**0.158**	**0.159**	**0.161**	**0.164**	**0.167**	**0.171**	**0.174**	**0.173**	**0.175**	**0.180**
EBITDA	**0.960**	**0.997**	**1.129**	**1.217**	**1.249**	**1.244**	**1.238**	**1.199**	**1.181**	**0.695**	**0.736**	**0.774**
Depreciation & Amortization (Book Dep)	-1.030	-1.028	-1.001	-0.979	-0.963	-0.963	-0.961	-0.963	-0.963	-0.963	-0.971	-1.048
EBIT	**-0.071**	**-0.030**	**0.128**	**0.238**	**0.286**	**0.281**	**0.277**	**0.235**	**0.218**	**-0.268**	**-0.234**	**-0.274**
Interest Income	0.001	0.006	0.008	0.009	0.010	0.008	0.000	0.000	0.000	0.000	0.000	0.000
Interest Expense	0.000	0.111	0.131	0.109	0.087	0.051	0.000	0.000	0.000	0.000	0.000	0.000
EBT	**-0.070**	**-0.135**	**0.004**	**0.138**	**0.209**	**0.237**	**0.277**	**0.235**	**0.218**	**-0.268**	**-0.234**	**-0.274**
Taxes	-0.028	-0.053	0.002	0.055	0.083	0.094	0.109	0.093	0.086	-0.106	-0.116	-0.132
Net Income	**-0.042**	**-0.082**	**0.003**	**0.083**	**0.126**	**0.144**	**0.167**	**0.142**	**0.132**	**-0.162**	**-0.118**	**-0.142**

Sources	
Equity	343,417
932 Grant	97,453
1603 Grant	30,000
Debt	104,258
Total Project Sources	**575,128**

Leverage	
Equity	59.71%
Debt	18.13%
932 Grant	16.94%
1603 Grant	5.22%

Debt	
Debt Term (Yr)	13 Years
Debt Paid Off (Yr)	4.5 Years
DSCR Ratio - Min	2.1x
DSCR Ratio - Avg	2.4x

Actual proforma meets the min debt coverage ratio per the LGA

Minimum Fuels Selling Price

	Year 1	Year 2
Biomass Cost	1.03	1.01
Cellulase Enzyme	0.36	0.36
Other Chemical & Utilities	0.55	0.57
Fixed Costs	0.32	0.33
General Expenses Costs	0.15	0.16
Financial Expenses	0.00	0.11
Total MFSP ($/gal)	2.42	2.53

No capital costs included because our capital includes all the development costs and other related costs therefore it is not representative of this type of plant

In MM $

4 - Feedback for the DOE IBR Team

Feedback for DOE IBR Team

- DOE Award coordination
- DOE Loan Guarantee coordination
- First draw timing
- Pilot plant and R&D value contribution

5 – Q&A and Pictures