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Innovative Technology Solutions for Sustainability

ABENGOA BIOENERGY

Pioneering Advanced Biofuels

US Department of Energy Biomass 2012

July 10, 2012

Chris Standlee – Executive Vice President

Abengoa Bioenergy US Holding, Inc.

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Overview

Abengoa (MCE: ABG) is an international company that applies innovative technology solutions for sustainable development in the energy and environment sectors, generating electricity from the sun, producing biofuels, desalinating sea water and recycling industrial waste

Sectors

Energy

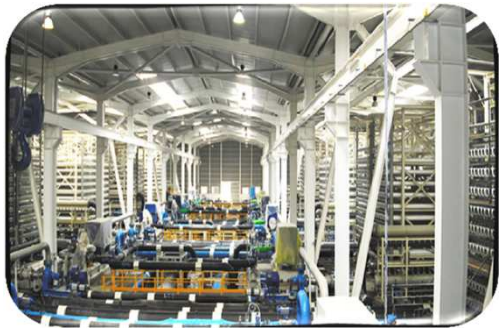
76 %

20 MW CSP Tower (Seville, Spain)

- Power transmission
- Solar
- Cogeneration
- Biofuels

Environment

24 %

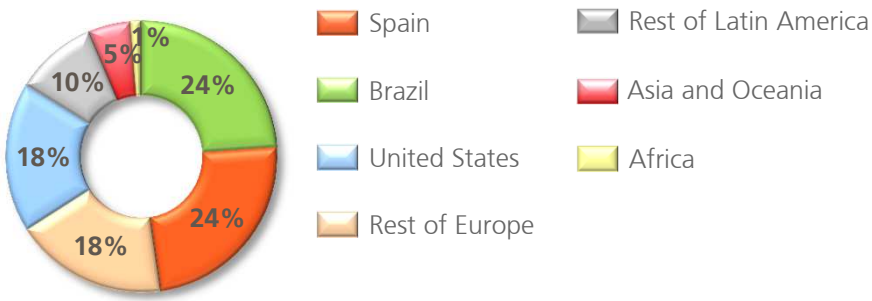


200,000 m³/day desalination plant. (Honnaine, Algeria)

- Desalination
- Industrial waste recycling

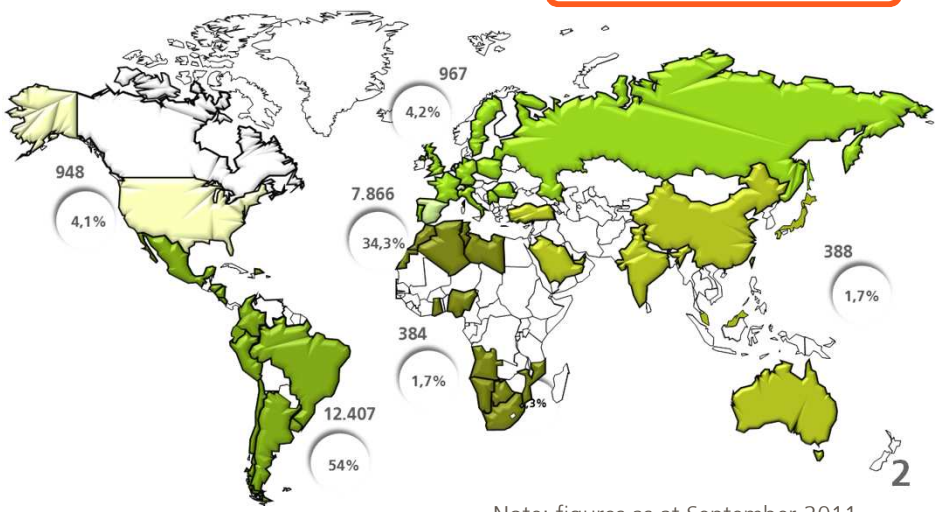
Geographies

Revenues (%)



Personnel

A total of 22,960 people



Note: figures as at September 2011.

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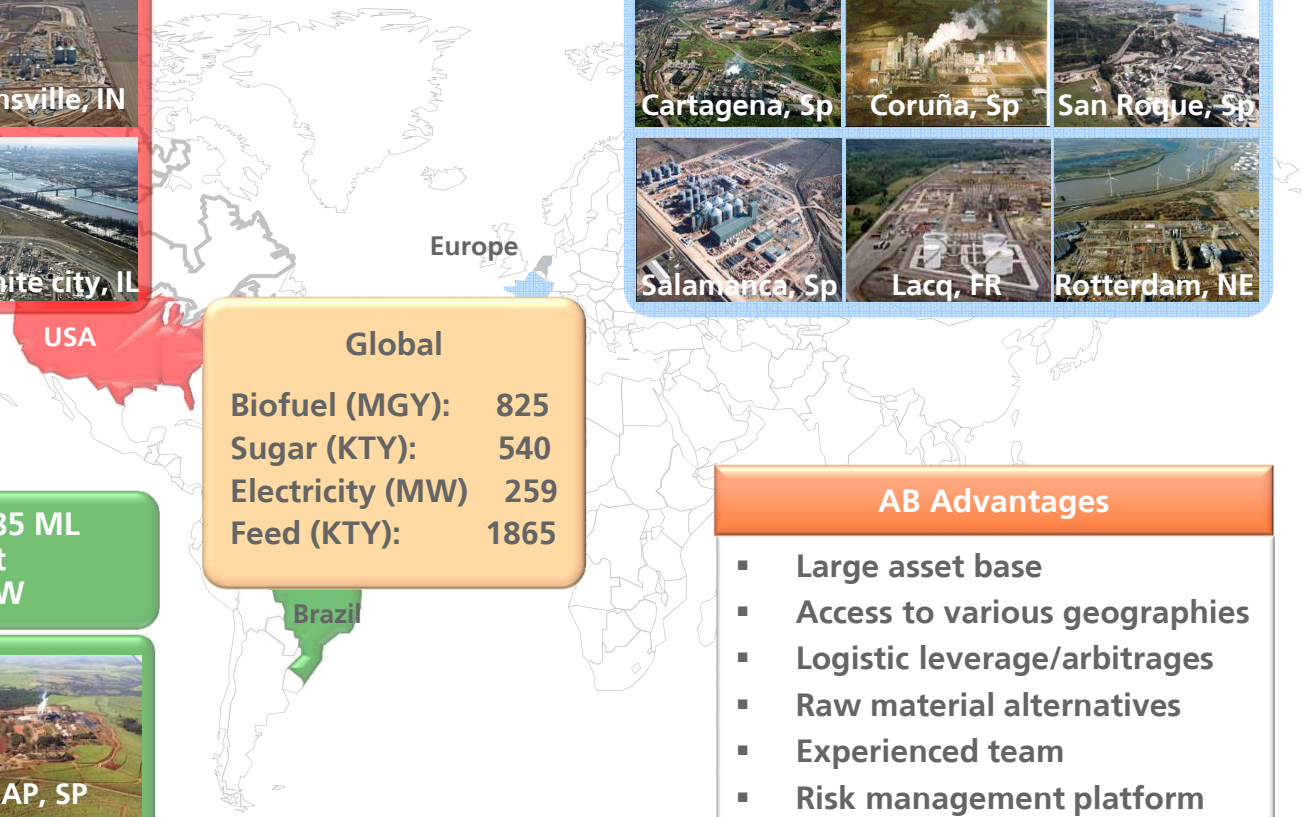
Abengoa Bioenergy

A leader in first generation…

Biofuel Capacity = 380 MG/1440 ML
Feed capacity = 980 Kt

Biofuel Capacity = 395MG/1500 ML
Feed capacity = 885 Kt
Cogen capacity = 119 MW



Global

Biofuel (MGY):	825
Sugar (KTY):	540
Electricity (MW)	259
Feed (KTY):	1865

Biofuel Capacity = 50 MG/185 ML
Sugar capacity = 540 Kt
Cogen capacity = 140 MW

AB Advantages

- Large asset base
- Access to various geographies
- Logistic leverage/arbitrages
- Raw material alternatives
- Experienced team
- Risk management platform

Strong position through diversification

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First generation supports development of second generation

Commercial Hybrid Biomass Plant Hugoton (KS, US)

- Capacity : 25 MGPY cellulosic ethanol, 20 MW renewable power
- Raw material : Corn stover, wheat straw, switchgrass
- Technology : Enzymatic hydrolysis (glucose & xylose)
- Objective : Production at a gasoline competitive cost
- Start-up Operations : 2013

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. : 2007

First generation financing issues

- Market risks different from other renewable power projects
  - Product off take risk (10-20 year purchase contracts of wind and solar not realistic, but risk was accepted)
  - Feedstock supply risk (sun and wind are free, while grain and sugar prices are volatile, but availability not a question – risk was accepted)

Second generation financing issues

- Risks more complex and numerous
  - Product off take risk (similar to 1st gen but with tax incentives expiring and RIN values unproven)
  - Feedstock supply risk (price history not proven, and availability could be a localized issue - long term contracts more important)
  - Technology risk added – it works on pilot scale, but production cost not proven at commercial scale

Hugoton, Kansas cellulosic ethanol plant started construction Sept. 2011

Project description

- Commercial scale enzymatic hydrolysis
- Capacity: 25 MGPY ethanol from biomass
- Electricity capacity: 20 MW gross renewable electrical power.
- Location: Hugoton, KS (US)
- Site: 400-acre parcel
- Feedstock: 1,100 dry tons/day corn stover
- Construction complete: 2013

Financing completed

- $ 97 million Section 932 DOE cost share grant
- $133 million EPAct 2005 loan guarantee

Direct Local Benefits

- $17 million in local feedstock purchases
- 300 direct construction jobs for 2 years
- 65 permanent local jobs at the facility
- $5 million annual payroll

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Construction Site Overview
April 2012

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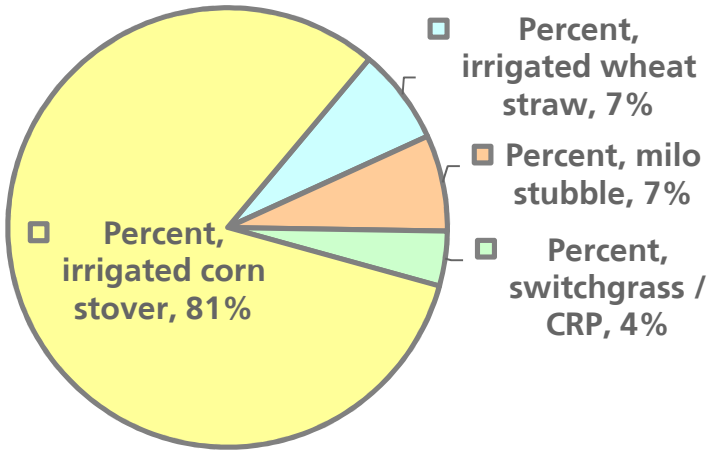
Fermentation tanks, distillation columns, boiler structure
June 2012

Biomass feedstock

Hugoton plant biomass feedstock needs

- **390,000 "dry" tons of biomass per year**
- **Less than 15% of available biomass available within 50 mile radius**



Irrigated Wheat Straw

Milo Stubble

Switchgrass

Irrigated Corn Stover

CRP Grassland

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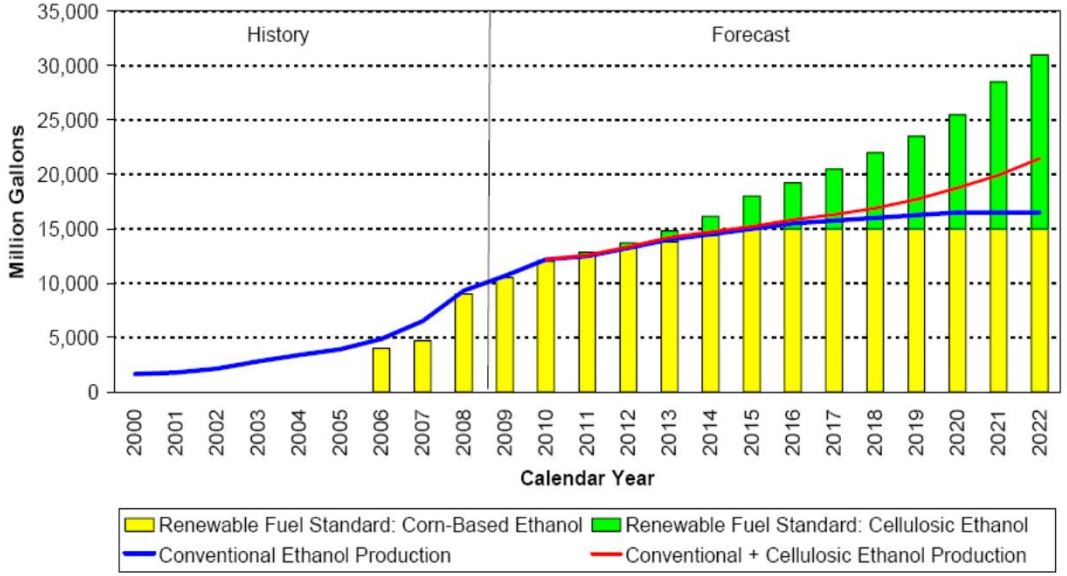
General Federal policy issues cellulosic ethanol

Key demand driver critical to success

- Demand is still driven by two key pieces of federal legislation and regulation that establish a government-mandated market for biofuels
  - The new Renewable Fuel Standard (RFS-2) legislation mandates the use of 36 billions gallons of renewable fuels annually (bgy) by 2022 (16bgy of cellulosic ethanol).
  - The EPA recently approved use of E15, fuel that contains up to 15 percent ethanol, in cars and light trucks model year 2001 forward

Additional key policy issues

- Extension of Production Tax Credit that expires December 31, 2012
- Extension and funding of key Energy Title issues in new Farm Bill legislation



Sources: DOE (History and Cellulosic Ethanol Forecast), Informa Economics (Conventional Ethanol Forecast), Energy Independence and Security Act of 2007 (RFS Levels)

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Questions?

Biomass Bales and
Fermentation Tanks
May 2012