ABENGOA BIOENERGY

Abengoa Bioenergy
Hybrid Biorefinery Concept

Sustainable Growth

Biomass 2009: Fueling Our Future
March 17, 2009
National Harbor, Maryland

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

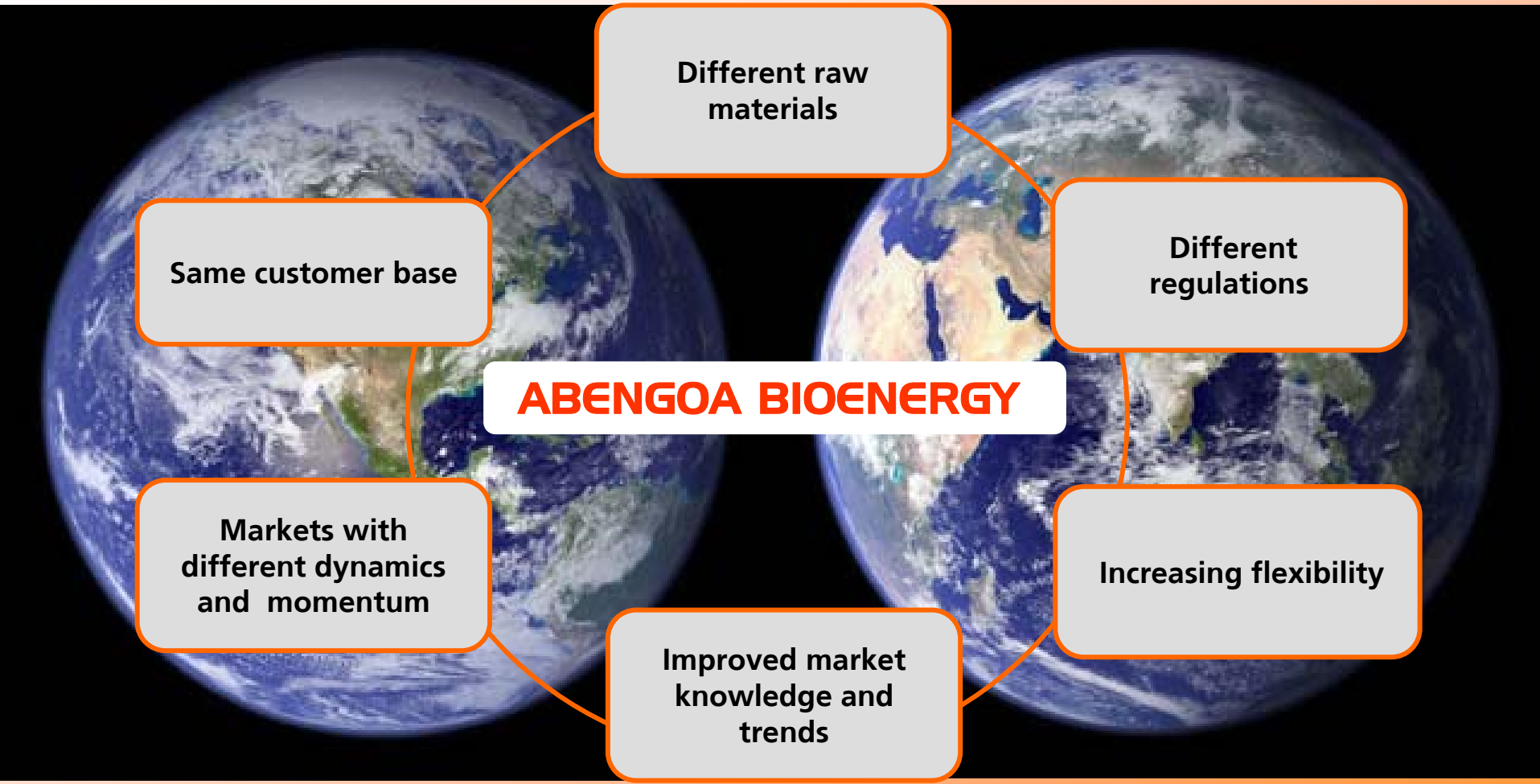
With the sun …
we produce thermoelectric and photovoltaic electric energy

Information Technology

Focus Abengoa

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

Global player ethanol advantages



Hybrid Refinery

Commercial Hybrid Biomass Plant Hugoton (KS, US)

- Capacity : 12 MG and 40MWe per production year
- Raw material : Corn stover
- Technology : Enzymatic Hydrolysis & Gasification Technology
- Objective : Demonstrate biomass conversion commercial viability
- Start-up Operations : 2011 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 : 2007

2.1 Project Description

Biorefinery

- Cellulosic feedstocks, 1100* dry metric tons per day total

- Enzymatic Hydrolysis, 400 dry metric tons per day
  Ethanol, 12 million gallons per year, qualified as Cellulosic Biofuel
  Co-products
- Gasification Process, 300 dry metric tons per day
  Synthetic gas (syngas), 157 MMBtu to high-pressure water-tube boilers
- Cogeneration, 400 dry metric tons per day feedstock, 200 tons per day stillage wet cake
  44-MW steam turbine
- Starch Ethanol, 88 million gallons per year ethanol, 750 thousand tons per year WDGS
  On hold due to market conditions

Biomass Procurement

- Procure, store, haul, and process all Biorefinery feedstocks

Co-gen Plant, co-located

- Biomass feedstocks, 600 dry metric tons per day

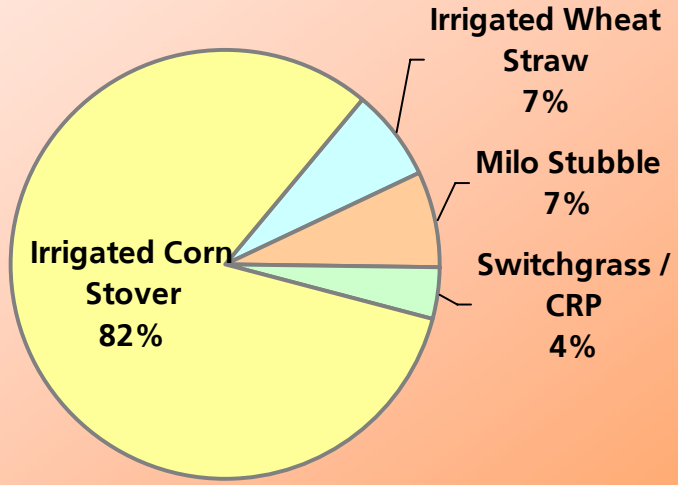
First of its kind combined Advanced Biofuels and Cellulosic Biofuels facility to seek financing.

Abengoa Bioenergy Hybrid of Kansas

- First commercial facility of Abengoa Bioenergy's Cellulosic Ethanol technology
- A $500 million plus project, supported by a $76 million grant from the Department of Energy plus an equity commitment from Abengoa Bioenergy. Project start of construction, 2nd Half of 2009, operation in 2011
- Located in South West Kansas
- Opportunity to leverage infrastructure at many plant operations
- Key first project in the successful growth of Abengoa's Cellulosic Ethanol Business and the Nation's Cellulosic Ethanol Industry

ABHK Biomass Input Today

- Estimated 300,000 – 550,000 acres of land
- 1750 “as is ” tons of biomass per day
- 750,000 “as is ” tons of biomass per year




Irrigated Wheat Straw


Milo Stubble


Switchgrass


Irrigated Corn Stover


CRP Grassland

ABHK Biomass Input Tomorrow

Up To 100% Switchgrass

Reasons

- Little to no fertilizer required
- Lower input costs
- Can be grown on poor soils
- Tolerant of flooding and drought
- Large potential from CRP and
- underutilized acres

Challenges

- Establishment cost for producer
- No immediate revenue for producer
- Availability
- Harvest and Collection methods

CRP Grassland

Financing

- Equity (competition for cash)
- Loan Guarantees
- Credit Rating
- Credit Subsidy Risk

Challenges/barriers

- Blend Wall
- Indirect Land Used
- NEPA
- Timing (financial situation)
- Technology Risk
- Raw Material risk
- Market Risk

Policies

- Loan Guarantees
- Biomass Crop Assistance Program (BCAP)
- Indirect land Used
- GHG cap and trade
- Renewable Portfolio Standard

BCyL Biomass Ethanol Plant