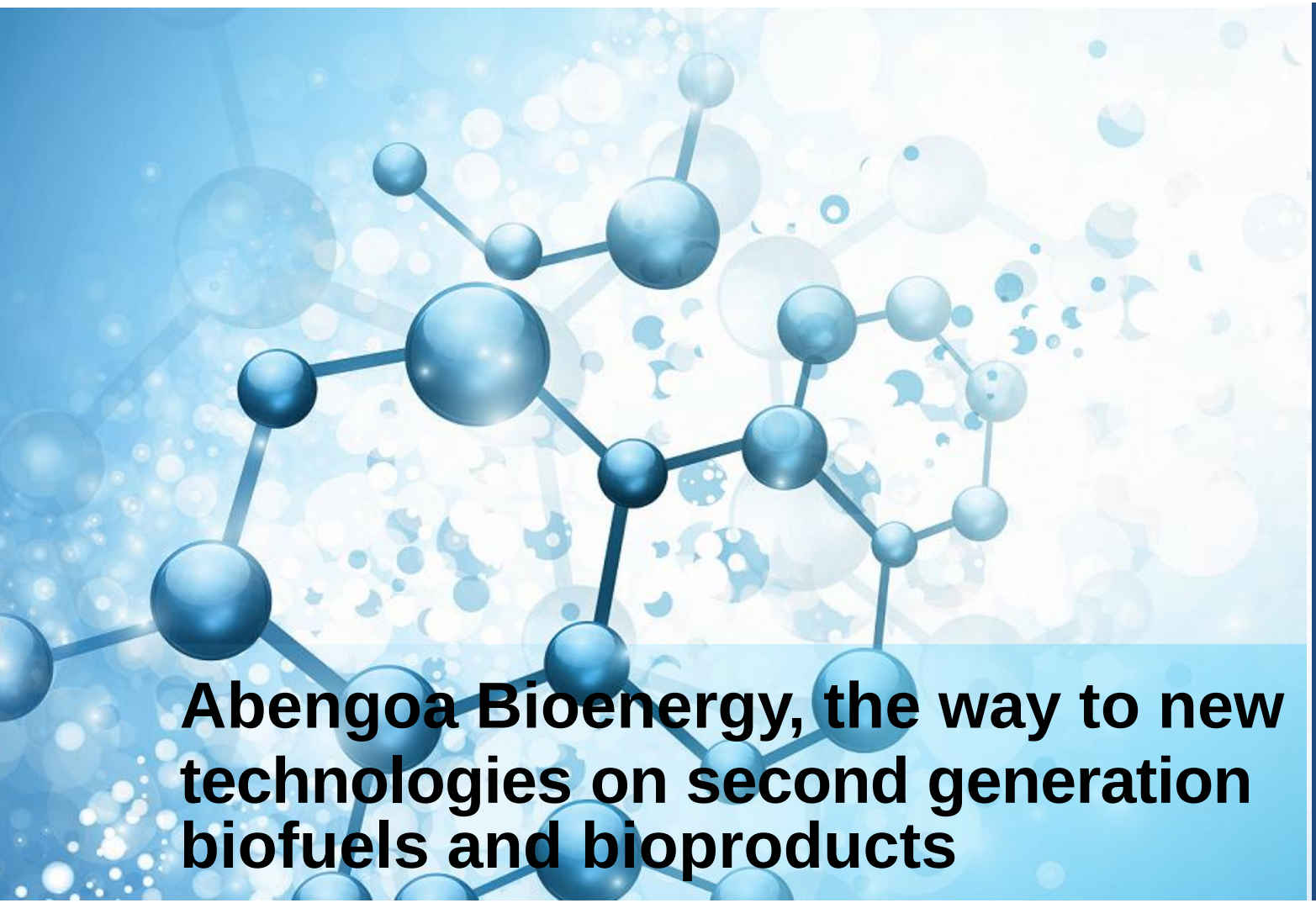


Abengoa Bioenergy, the way to new technologies on second generation biofuels and bioproducts

The global biotech ethanol company

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

2013 Forward

- ✓ Expected startup of first cellulosic ethanol commercial scale plant
- ✓ 2G technology licensed to 3rd parties
- ✓ Waste-to-biofuels technology developed

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

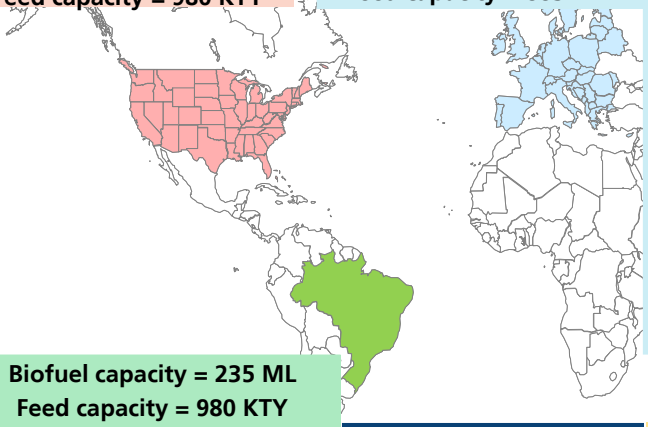
Ravenna, NE
341 ML
since 2007

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

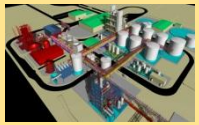
Sao Joao, SP
144 ML
since 2007

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

Camilo Ferrari, SP
0.3MT
since 2011

Global production	2011
Ethanol (ML):	2,950
Sugar (KTPY):	570
Feed (KTPY):	1,865
Electricity (MW):	259
Biodiesel (ML):	225

2G Assets



Commerical biomass plant Hugoton (KS, US)
95 ML
2013e

Biomass **demonstration** plant in BCyL (Salamanca, Spain)
5ML
since 2009

Biomass **pilot** plant in York (NE, US)
0.1 ML
since 2007

ABENGOA BIOENERGY

…with unique platform of unparalleled scale and scope

Markets

U.S

+

EU

+

Brazil

Technology

First Gen

+

Second Gen

Products

Ethanol

+

Biodiesel

+

Feed

+

Sugar

+

Electricity

+

CO2

Expertise

Agriculture

+

Technology

+

Production

+

Logistics

+

Trading

€2,225MM
2011 Sales

€152MM
2011 EBITDA

€3,005MM
2011 Net Fixed Assets

4,605
2011 Employees

ABENGOA BIOENERGY

…developing unique competencies

Exceptional platform

- Only truly global biotech platform
- Diversified and differentiated product mix
- Unique risk mitigating attributes for each asset
- Serving large, established and growing markets

Superior technology with significant growth prospects

- Leader in second generation (2G) biotech
- Ability to target new growth industries
- Platform to capture growth opportunities globally

Best in class strategy and execution

- Strong financial performance
- Robust risk management systems
- Experienced leadership and operations expertise

ABENGOA BIOENERGY

…with proprietary technology making us time-to-market leader

Enzymatic hydrolysis

- ✓ Proprietary process technology:
  - ✓ +6,000h at demo scale
  - ✓ Over 73 gal/t at pilot scale
  - ✓ 36 IP ownerships and applications

Enzymes program

- ✓ Proprietary process technology + Licensed technology
  - ✓ Under 1 $/gal ethanol
  - ✓ Six new strains coming in 2012

Fermentation (C5 Program)

- ✓ Licensed technology
  - ✓ Over 98% glucose consumption
  - ✓ Over 95% xylose consumption

Catalyst

- ✓ Ethanol synthesis own technology
  - ✓ 3 patented catalyst and 3 new patents ongoing
  - ✓ Over 40% ethanol selectivity
- ✓ Butanol from ethanol own technology
  - ✓ 1 Patent issuing
  - ✓ Over 90% selectivity

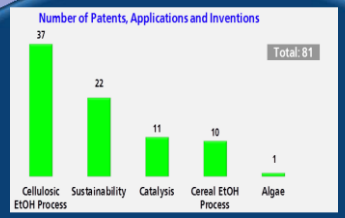
Sustainability

- ✓ EC approved Abengoa's RED Bioenergy Sustainability
- ✓ 22 IP ownerships and applications

IP: 86 patents, applications and inventions

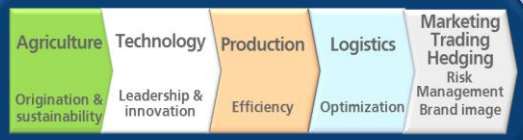
ABENGOA BIOENERGY

We have used technology to develop a new platform…



Technology IP platform

3,000 ML/year existing sugar/biomass capacity in operation



Core competencies

Multi-bioproduct platform

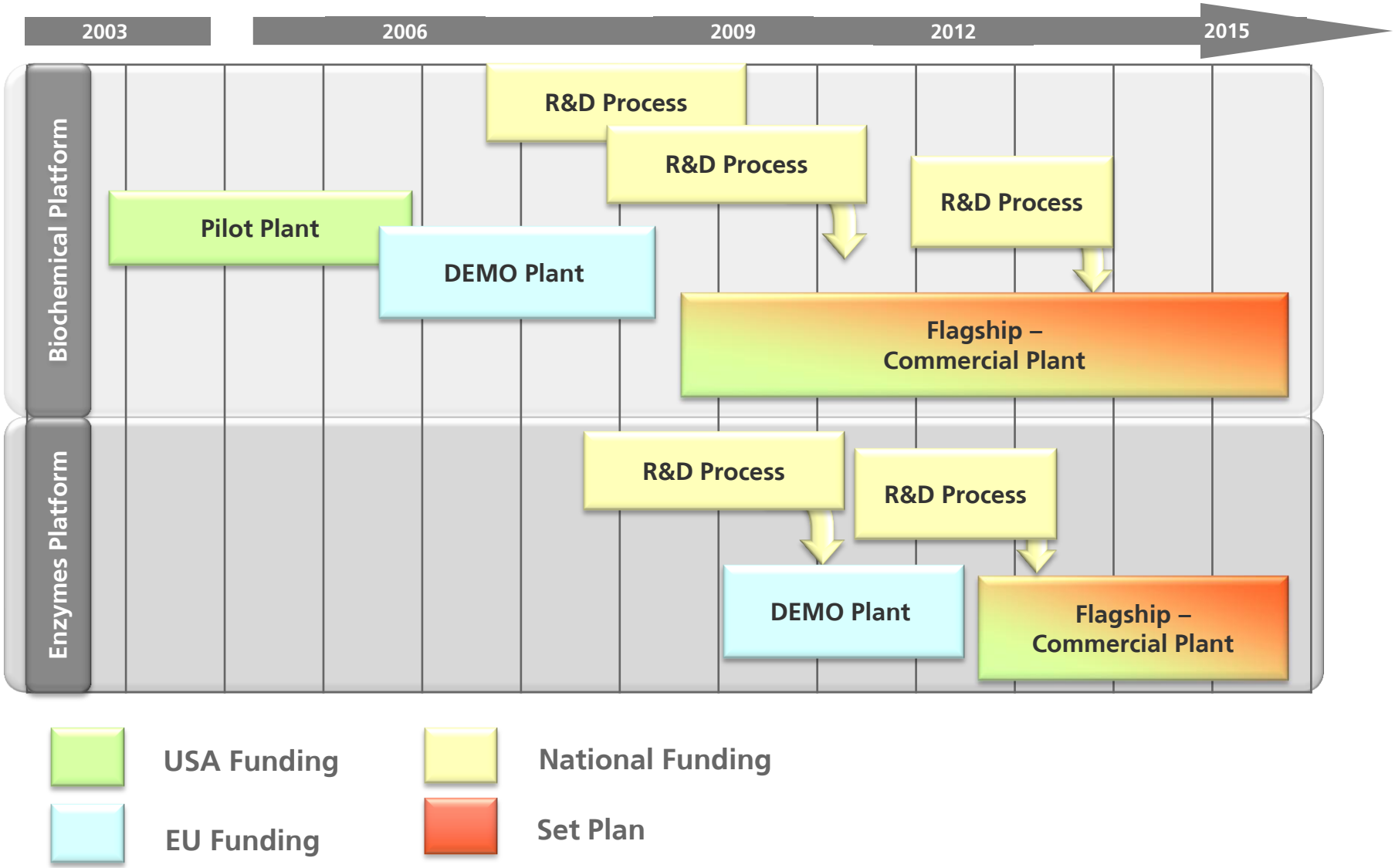
- Biofuels
- Power
- Biochemicals
- BioPlastics

2G biofuels

Solid waste-to-biofuels

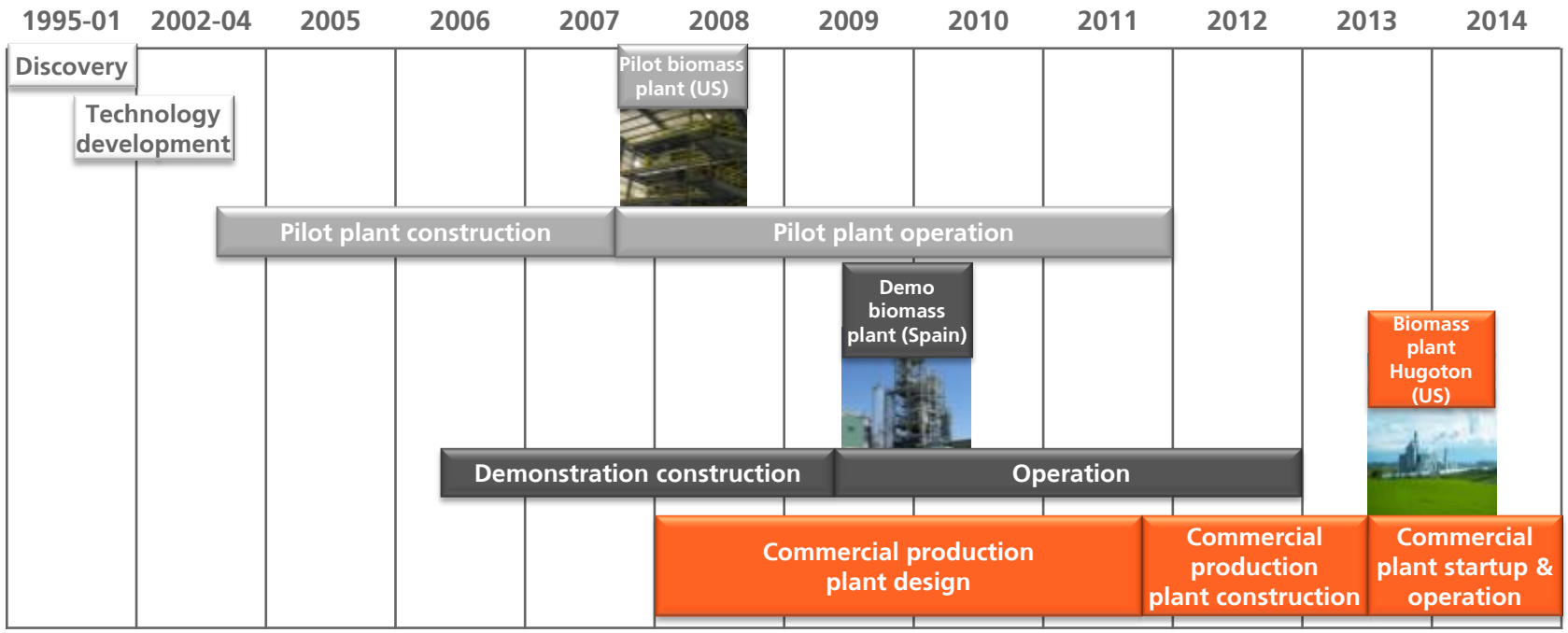
ABENGOA BIOENERGY

...supported and evaluated by 3rd Parties...



ABENGOA BIOENERGY

…and after investing for 10 years…



- 10 years of technology development
- +85 patents ongoing
- +650 USD M invested
- 140 USD M DOE loan guarantee federal financing for Hugoton project
- +27,500 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 BIOENERGY

...through a well defined pathway...

BCyL Demo Plant

York Pilot Plant

- Over 26,000 h operating York pilot plant
- Over 6,000 h operating BCyL demo plant
- Reaching targets on yields
- Demonstrating enzymes performance
- Fermenting C5 over expectations
- Validating unit operations performance

A fully commitment approach to the technology success

Hugoton project highlights

- Capacity: 25 MGPY ethanol from biomass
- Electricity capacity: 18-MW electr. power. Neutral to grid
- Location: Hugoton, Kansas
- Site: 400-acre parcel
- Feedstock: Corn stover, switch grass
- Estimated start-up: 2013
- Biomass: ~320,000 dt per year contracted fix price for 10y

- 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 100 M USD grant and $130 million federal loan guarantee to cofinance facility construction
- US government financing verifies our 2G technology and acknowledges our pioneer status
- Facility will allow us to fulfill our objective to become a one-stop biotechnology company

1st commercial-scale biomass to ethanol plant construction started

...and accessing new growth industries

Sugar to move beyond biofuels into petrochemical complex; Sugar: the molecule of the future

Gasoline
349 BGY

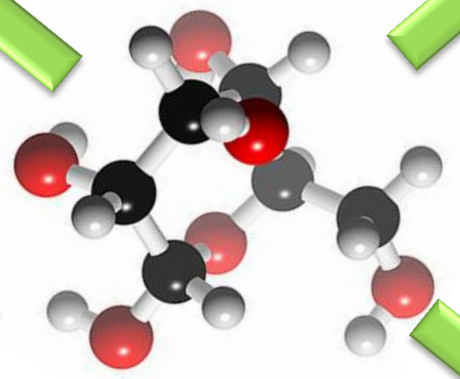
Jet
94 BGY

Diesel
484 BGY

PMMA
739 BGY

Polyesters/Xylene/Styrene
27BGY

Poly-Propylenes
32 BGY



Chemicals

Rubber, Lubricants & Additives
8 BGY

Organic Acid

Surfactants

Energy

3%-5% share of Power generation by 2050

10%-20% share of Primary Energy by 2050