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Rethink Tomorrow

Cellulosic ethanol: US Pilot and demonstration scale activities

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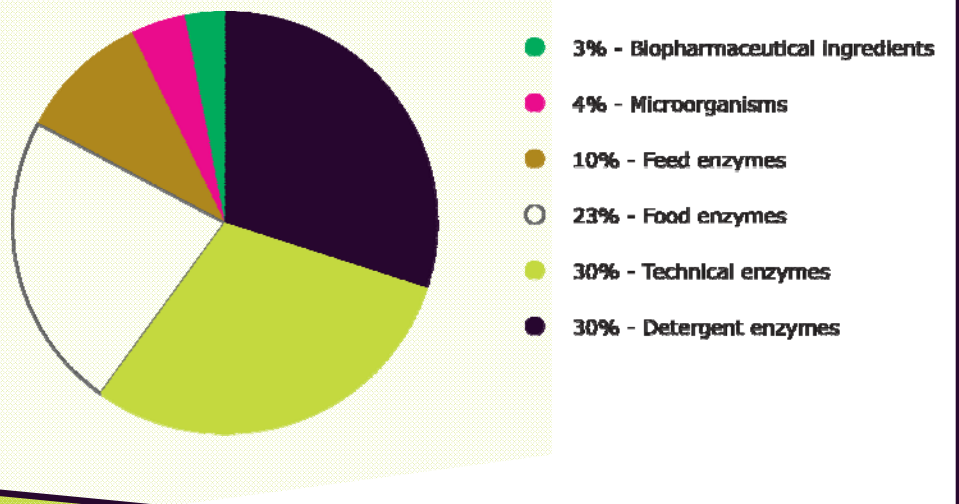
- Introduction to Novozymes
- US support (e.g. DoE roadmap and project overview)
- Status on two projects
  - Mascoma: Consolidated bioprocessing
  - POET: Project Liberty

Novozymes – Brief introduction

- World leader in bioinnovation, ~47% market share in industrial enzymes
- Enzymes account for >90% of sales
- More than 700 products sold in 130 countries in 40 different industries
- ~13% of sales invested in R&D
- More than 5,000 granted or pending patents
- Main production in the US, China, and Denmark
- Sales USD ~1.5 billion (FY2007)
- Strong profitability (19.9% FY2007) and solid generation of cash flow (~13% of sales)
- More than 4,900 employees

Novozymes' business distribution
Sales 2007 ~ USD 1.5bn



Novozymes and biofuel: Enzymes for commercial production of cellulosic ethanol ready by 2010

- Largest supplier of enzymes to the "starch" fuel ethanol industry
- ~13% of total sales in 2007
- Mainly a US business
- New processes reduce energy need and improve yields from corn-based production
- Collaborations in cellulosic ethanol with industry leaders:
  - POET in the US
  - ICM in the US
  - KL in the US
  - CTC in Brazil
  - COFCO in China
- Enzymes for commercial production of cellulosic ethanol ready by 2010

The US government has set a strong vision, defined roadmaps and passed supporting policies

US vision and leadership

2006

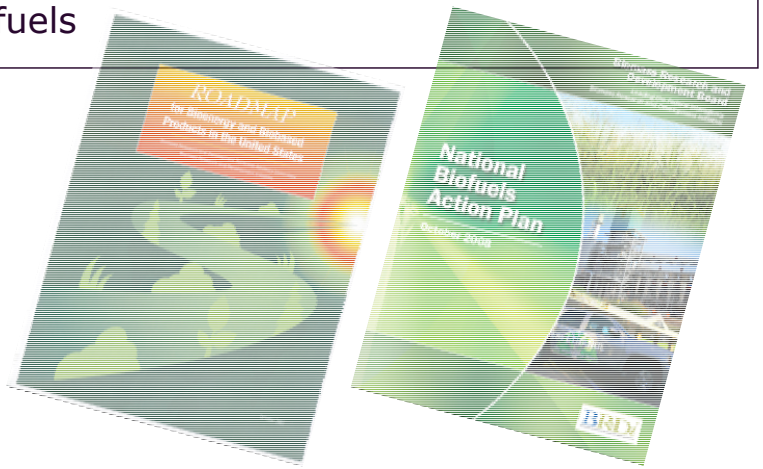
- "End US addiction to oil" → roll-out Advanced Energy Initiative

2007

- "Twenty-in-Ten" initiative
- DOE's 2007 roadmap
- Congress passes EISA – including new RFS mandating 36 BnG biofuel use by 2022

2008

- Congress passes Farm Bill – also supporting biofuels



Major advanced biofuel initiatives

DoE commitment to investment in advanced biofuel RD&D partnerships

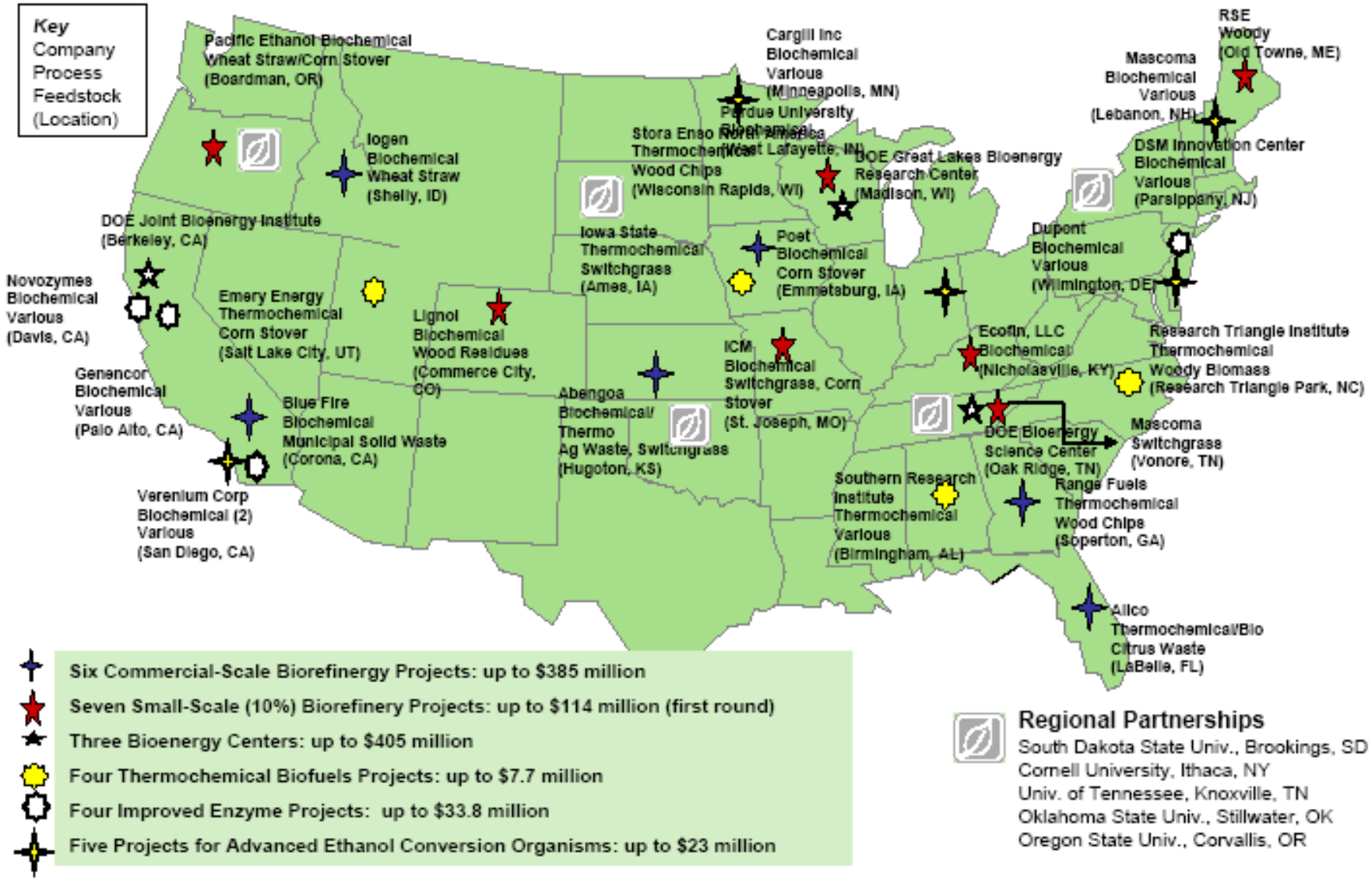
- Up to $272 million for commercial scale biorefineries
- Up to $240 million for demonstration scale biorefineries
- More than $400 million for bioenergy centers
- Additional $200 million funding opportunity for pilot and demo scale biorefinery projects announced December 22nd, 2008

Obama / Biden campaign's energy plan

- Mandate 60 BnG biofuel use by 2030
- Invest $150 billion over 10 years to accelerate commercialization of green-tech
- Mandate all new vehicles are FFV

Source: US Department of Energy, US President Obama's campaign website

Today's status: Major biofuel projects supported by the US Department of Energy



Source: US Department of Energy

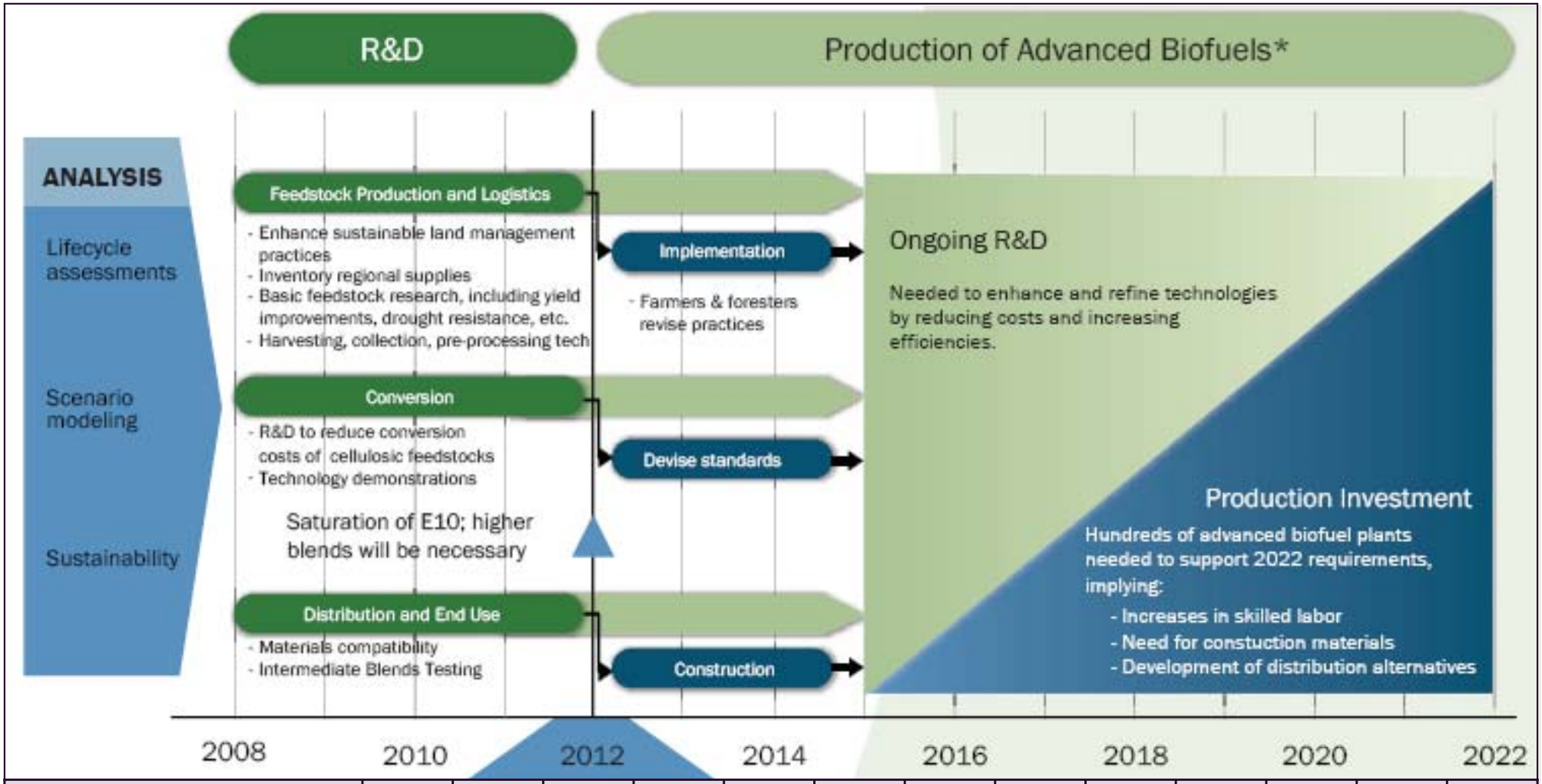
Among these are a number of demonstration-scale and commercial-scale biorefineries

Small-scale cellulosic biorefineries	Integrated cellulosic biorefineries

• **ICM Inc.**
  • Enzymatic/Fermentation; corn fiber/stover, switchgrass, sorghum
  • Up to $30 million
• **Lignol Innovations Inc.**
  • Solvent/Fermentation; wood chips, ag. residues
  • Up to $30 million
• **Pacific ethanol Inc.**
  • Enzymatic/Fermentation; wheat straw, corn stower, poplar
  • Up to $24,3 million
• **NewPage Corp.**
  • Thermochemical/FT; woody biomass
  • Up to $30 million
• **Flambeau River Biofuels**
  • Thermochemical/FT; wood and forest residues
  • Up to $30 million
• **Verenium Biofuels Inc.**
  • Enzymatic/Fermentation; SC bagasse, energy crops, wood, etc.
• **RSE Pulp**
  • Hemicellulose extraction; woody biomass/pulp
  • Up to $30 million
• **Ecofin LLC**
  • Enzymatic/Fermentation (solid state); corncobs
  • Up to $30 million
• **Mascoma**
  • DMC/enzymatic; switchgrass and hardwood
  • Up to $25 million
	• **Abengoa Bioenergy**
	  • Enzymatic/Fermentation/(Thermochemical); wheat straw, sorghum stubble, switchgrass, etc.
	  • Up to $76 million
	• **BlueFire Ethanol Inc.**
	  • Concentrated acid/Fermentation; sorted green and wood waste from landfills
	  • Up to $40 million
	• **POET**
	  • Enzymatic/Fermentation; corn fiber/cob/stalk
	  • Up to $80 million
	• **Range Fuels**
	  • Thermochemical/Proprietary catalyst; Timber and forest residues
	  • Up to $76 million

Source: US Department of Energy

Complementing DoE's supply-side activities, the RFS* ensures future demand for cellulosic ethanol



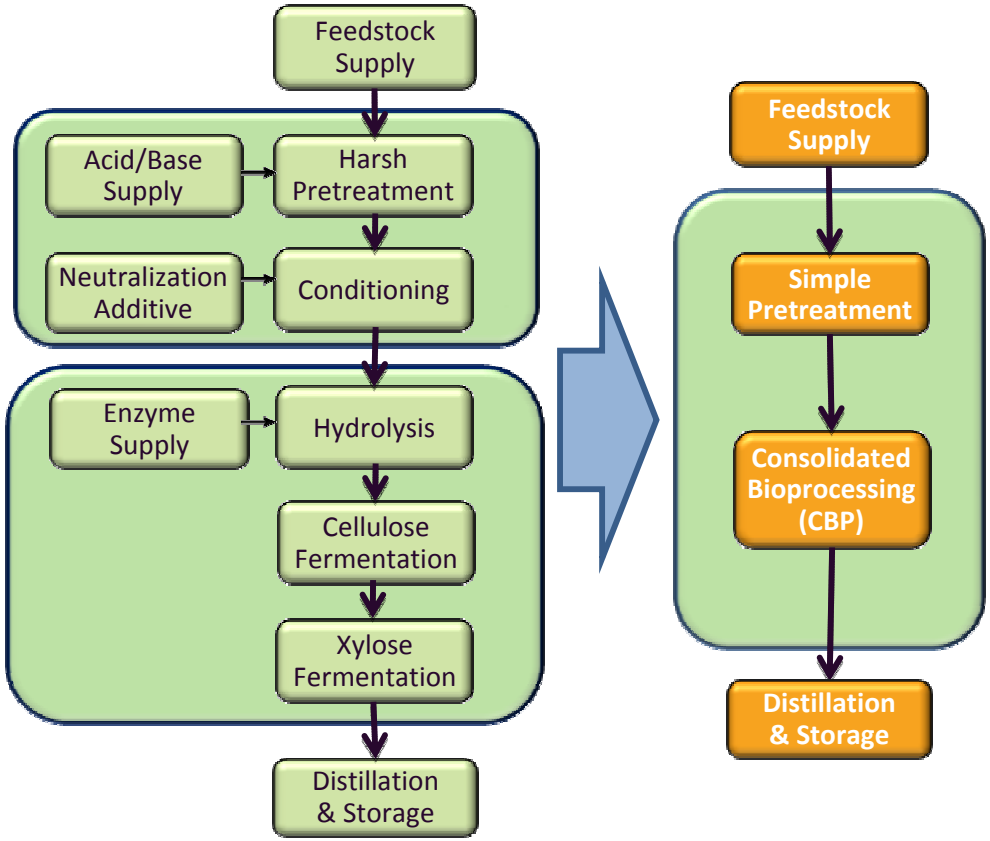
Mandated cellulosic ethanol volumes (BnG)*	0,1	0,25	0,5	1,0	1,75	3,0	4,25	5,5	7,0	8,5	10,5	13,5	16,0

Source: US Department of Energy,

* Renewable Fuel Standard, Energy Independence and Security Act (2007)

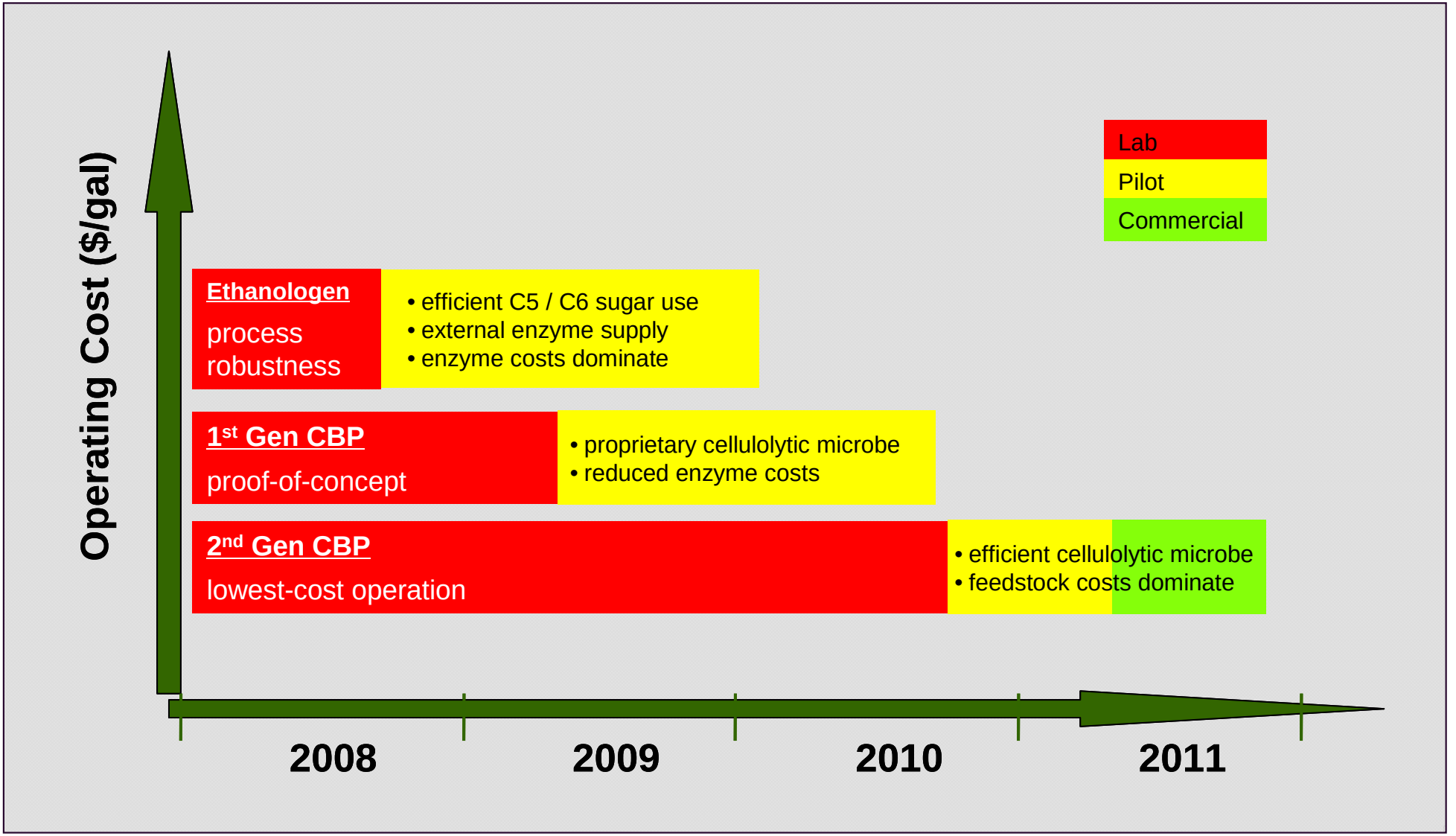
Mascoma: R&D into consolidated bioprocessing for cellulosic ethanol and later green chemicals

- Massachusetts based company active in R&D of:
  - Bioengineering of ethanol-producing microbes
  - Cellulosic ethanol conversion systems for different feedstocks, pretreatment technologies, etc.
- Founded in 2005 with initial funding from Khosla Ventures and Flagship Ventures – later investors have included GM
- Has received funding from the DOE and from the states of New York and Michigan



Source: Mascoma

Mascoma's ambition is to be able to commercialize it's technology by 2011



Source: Mascoma

POET: The world's largest ethanol producer is going for cellulosic ethanol

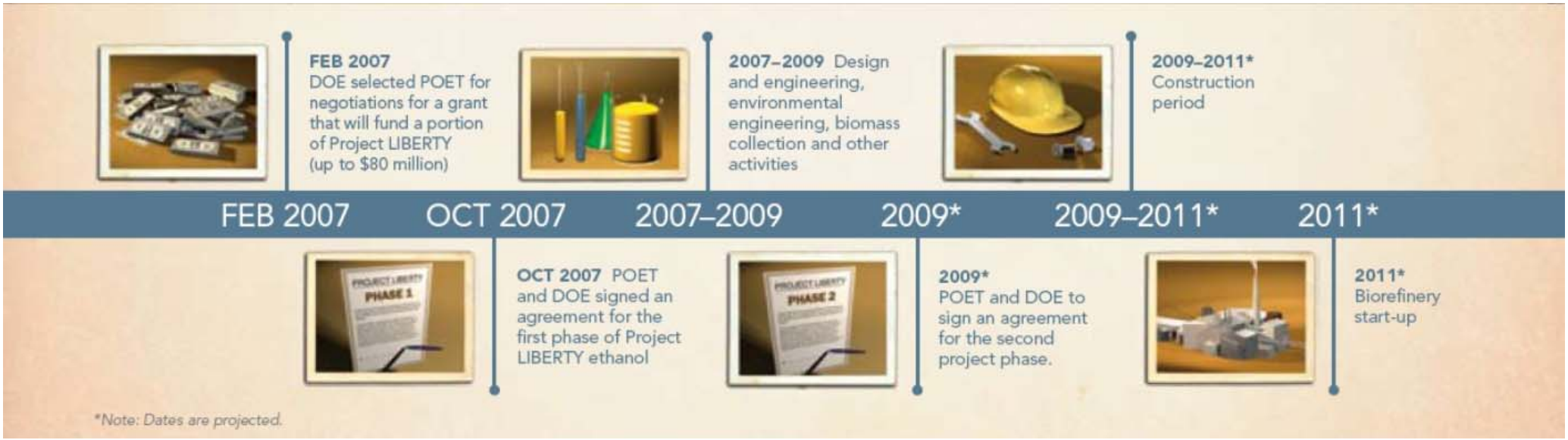
- Established in 1983 – first commercial scale production of corn ethanol in 1986
- World's largest ethanol producer with more than 1 billion gallons of ethanol per year
- Delivers design, engineering, construction, management and marketing services for a network of 26 ethanol plants
- Currently runs pilot scale production of cellulosic ethanol from corn cobs
- Received DoE grant of $80 million in 2007 to build integrated cellulosic biorefinery

Source: POET

POET: Adding commercial scale cellulosic ethanol to the existing corn ethanol stream

POET: Project Liberty

- Project Liberty integrates a cellulosic ethanol plant with an existing corn ethanol plant
  - **125** million gallons of total annual ethanol capacity
  - **25** million gallons of annual cellulosic ethanol capacity – from corn cobs & fiber
  - **11%** more ethanol produced per bushel of corn
  - **27%** more ethanol produced per acre of corn
  - **5 billion gallons** of ethanol can be made from U.S. corn cobs alone



Source: POET