



Biorefinery Development: A United States Perspective

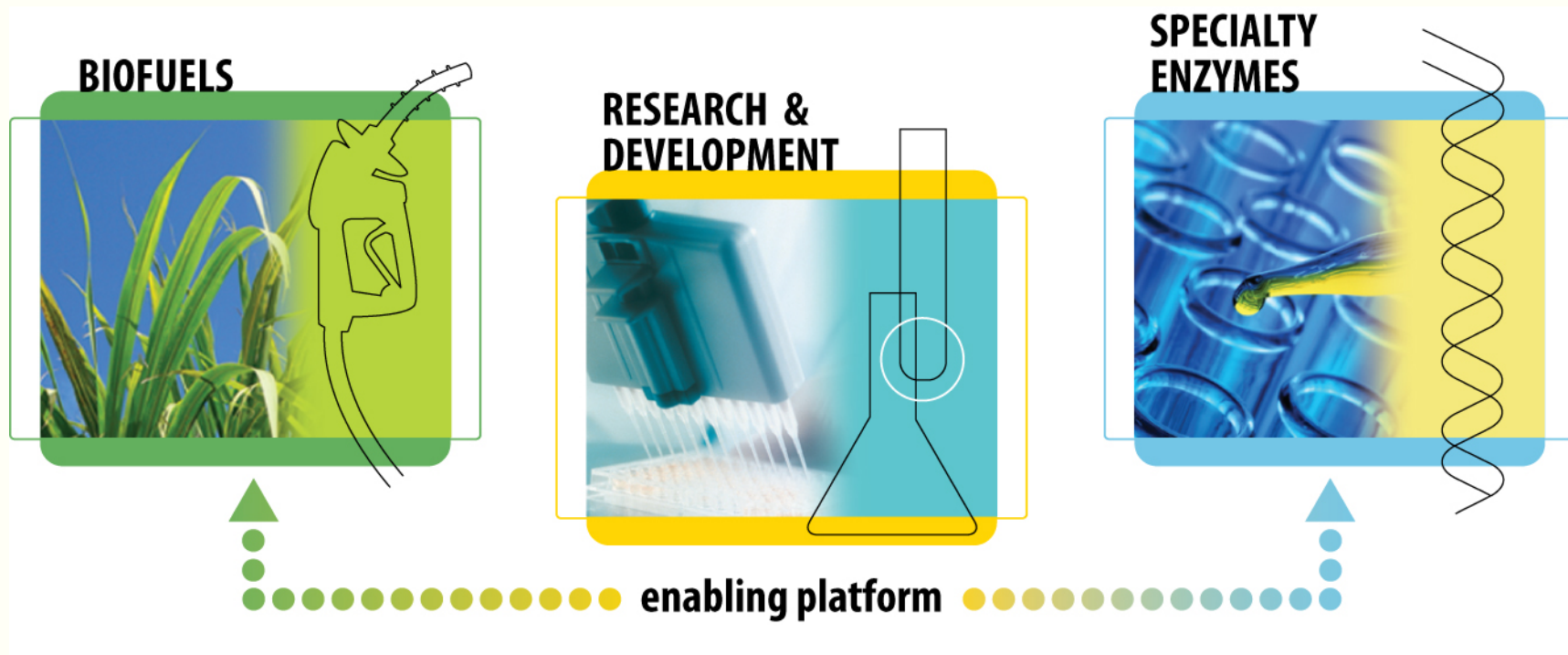
September 12, 2007

John B. Howe, VP, Public Affairs
German Biorefinery Congress 2007
Berlin, Germany – September 12, 2007

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Verenium Corporation (Nasdaq: VRNM)

Merger created strategic synergies, economy of scale



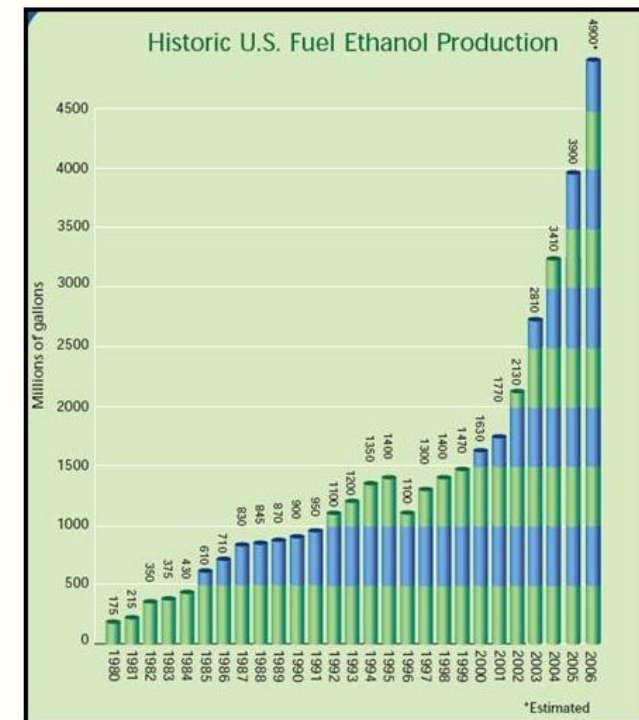
Outline of Presentation

- Driving factors in recent growth in US biofuels markets – and shifting focus to 2G “advanced biofuels”
- Recent US policy initiatives to promote cellulosic ethanol technology research, development & deployment (“RD&D”)
- Overview of Verenium Corporation:
Technology overview, recent progress, five year plan
- Realizing the vision of a 21st century biofuels industry:
remaining obstacles in public policy



Recent Growth of the US Ethanol Industry

- Episodic US interest in ethanol since the dawn of the auto era
 - 1900s (Ford's "Fuel of the Future")
 - 1930s ("Chemurgy Movement")
 - 1970s ("Gasohol")
- Sustained growth began with onset of higher petroleum prices post-2000
- Spurred by the ban of oxygenate MTBE by three US states in 2004 (CA, NY, CT) – now banned in ≈half of the states



Source: Renewable Fuels Association



The Grain Ethanol Backlash of 2007

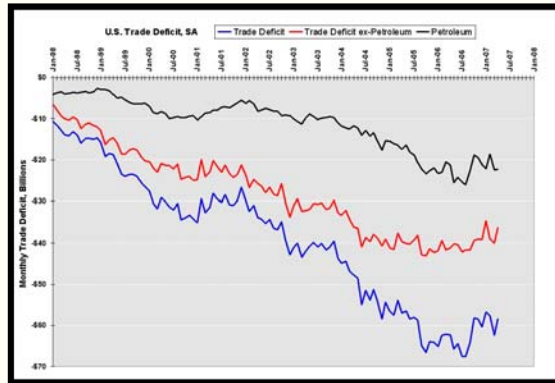
- To date, 97% of all US ethanol capacity is based on corn (land, water and fertilizer intensive)
- 2x rise in grain prices (2006) has triggered a high-profile “food vs. fuel” controversy
- A broader debate is now underway in the US: how to integrate US biofuel needs with other considerations, e.g.,
 - Food requirements
 - Land and water use
 - Net energy balance
 - Net carbon balance
- Further growth in ethanol is critically dependent on progress in industrial biotechnology



US News & World Report,
February 2007



The US Fuels Dilemma Requires a Solution



\$ Impact on US Competitiveness

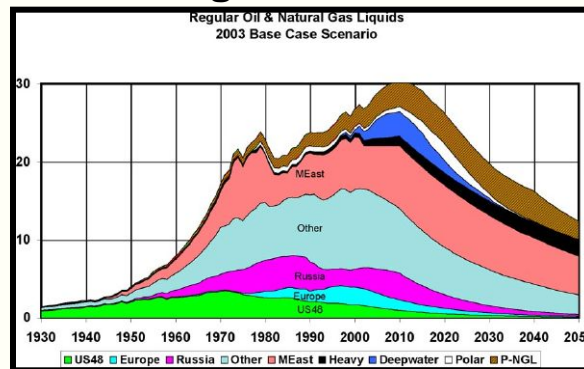


Global Climate Change

Threat of Terrorism



How Long Until “Peak Oil?”



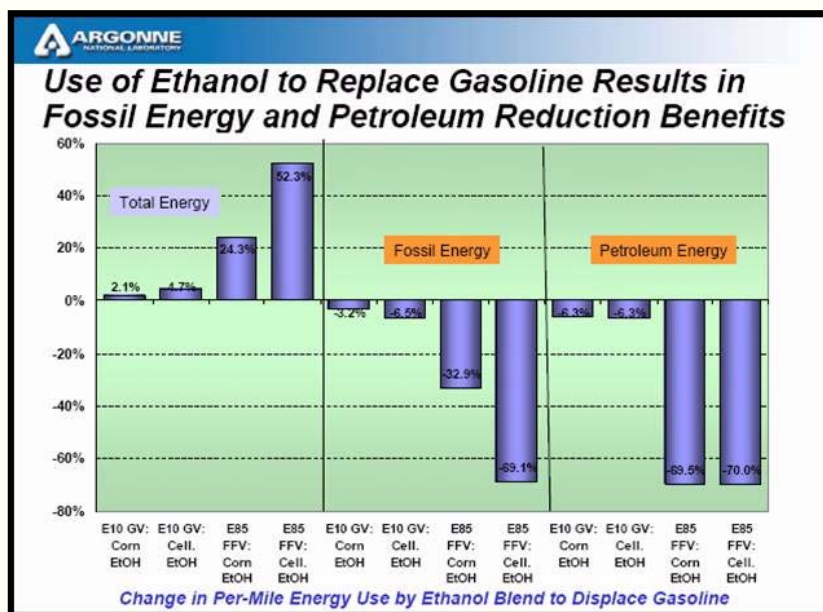
***Despite Controversy, US Support for
Non-Petroleum Fuels Remains Strong***



The Transition is Now Underway to 2nd Generation “Advanced Biofuels”

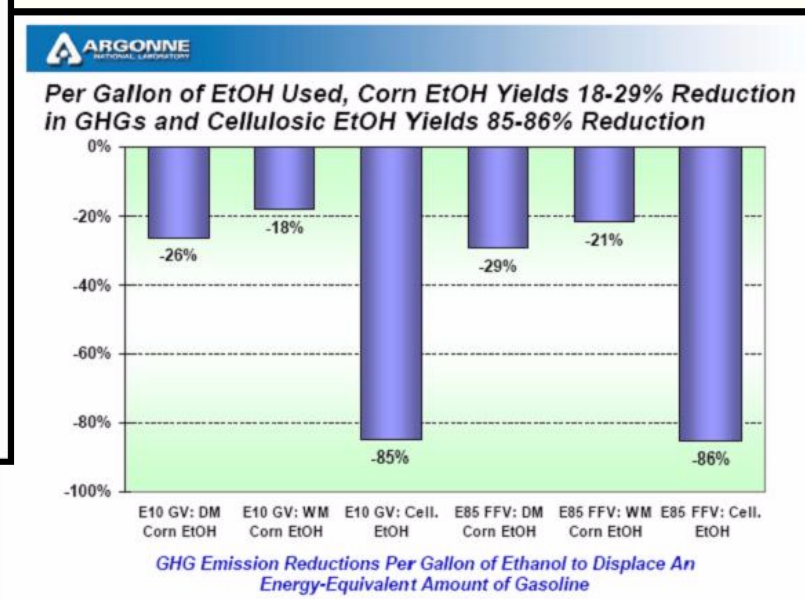
- Cellulosic biomass offers much greater total abundance (2005 Oak Ridge National Laboratory “Billion Ton Study” finds potential for 1.3B tons on an annual recurring basis)
- Potential for much higher ethanol productivity per acre than corn (1500-1800 gallons/acre vs. 400)
- Lower input requirements (e.g., fertilizer, pesticide, herbicide, irrigation water)
- Higher net energy production (EROEI) and dramatically lower net carbon emissions

Energy, Environmental Advantages of CEtOH



CEtOH results in higher net energy

CEtOH results in lower net carbon



Source: M. Wang, Argonne National Laboratory "Well to Wheels Study"



EPAct 2005 Incentives for CEtOH Development

- Direct production incentives, e.g.,
 - Increased Renewable Fuels Standard / 2.5x credit for CEtOH
 - Additional \$.10/gallon credit for CEtOH
 - “Reverse Auction” for production of first 1B gallons of CEtOH
- Incentives for deployment of E85 “Flex Fuel Vehicles”
 - Tax credits for buyers of new alternative fuel vehicles
 - Mandates for purchases of government fleets
- Expanded government-funded RD&D
 - Enlarged programs in Bioenergy, Biomass RD&D
 - Loan guarantees and grants for biorefinery projects



The President's Biofuels Initiative (2006)

- Feedstock Development
 - Develop handling, conversion technologies for a broader range of feedstocks
 - New organisms and processing techniques – aimed toward “consolidated bioprocessing”
 - Regional Biomass Energy Feedstock Partnerships (to help each region of US contribute toward goal of 1.3B dry tons)
- Conversion Technologies
 - DOE's focus is on progressing both biochemical and thermochemical platforms
 - Initiative targets improved pretreatment catalysts as well as more efficient enzyme cocktails



Current DOE Bioenergy RD&D Initiatives

- Integrated Biorefinery Demonstration Projects
 - awards announced 2/07; six projects, \$385M
- Improved Ethanologens
 - awards announced 3/07; five projects, \$23M)
- Bioenergy Research Centers
 - awards announced 6/07; three projects, \$375M)
- 10% scale demonstration biorefinery projects
 - bids submitted 8/07; up to \$200M)
- Improved Cellulase Enzymes
 - bids due 10/07; up to \$33.8M)
- Loan Guarantees
 - Project submissions 12/06; DOE action pending)



VRNM: Cellulosic Ethanol Plant Operations

Industry leading production and development capabilities

PILOT PLANT



- One of the only fully integrated pilot plants in the US
- Operational pilot-scale facility for dynamic R&D
- Jennings, Louisiana

DEMO PLANT



- 1.4 MGY demo plant under construction
- Cellulosic ethanol from sugarcane bagasse, specially-bred energy cane, other feedstocks
- Mechanical completion expected by the end of Q108
- Jennings, Louisiana

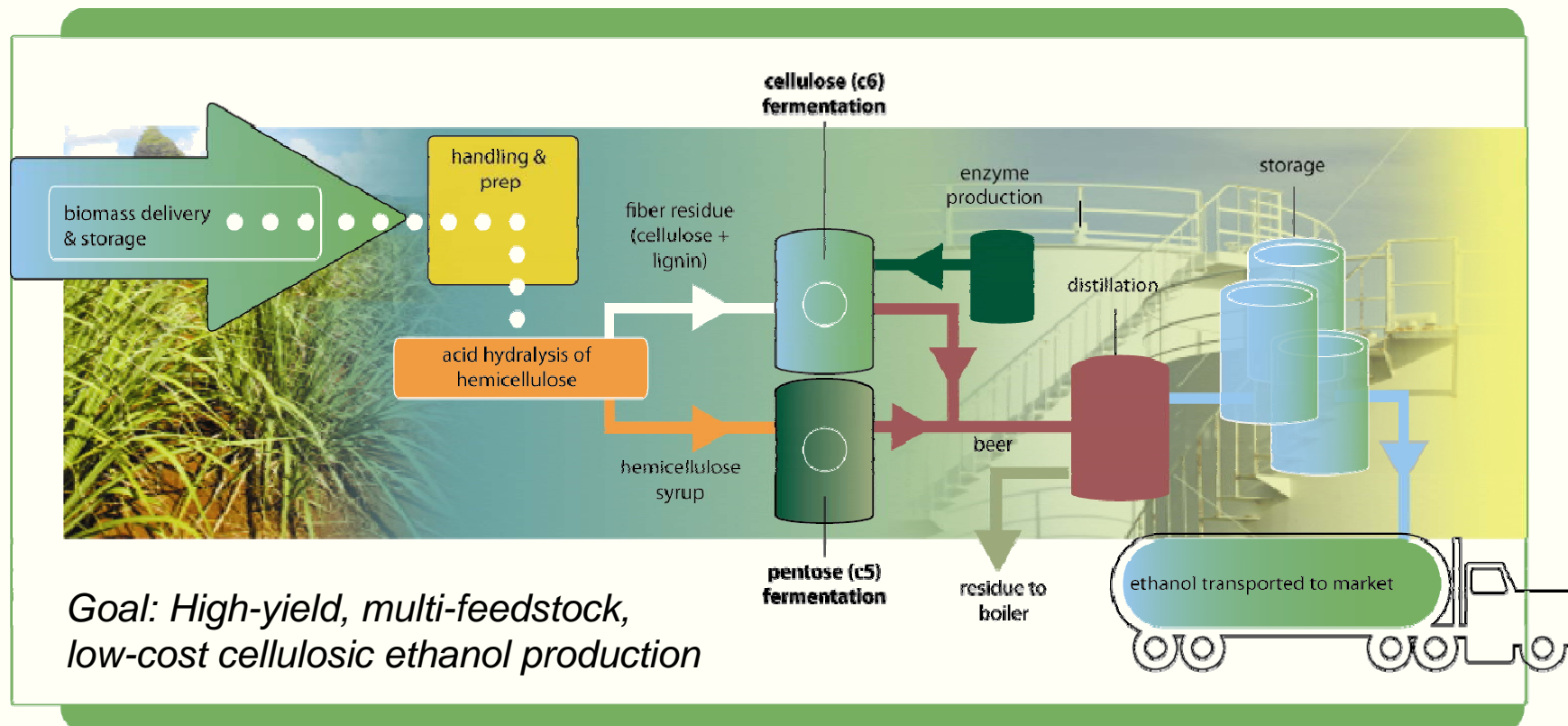
DEMO PLANT



- 1.4 MLY demo plant operating under license
- Licensed by Tokyo-based Marubeni TSK
- World's first commercial plant to produce cellulosic ethanol from construction wood waste
- Osaka, Japan

Proven Cellulosic Ethanol Technologies

The Verenium Production Process



Unique Enzyme Technologies

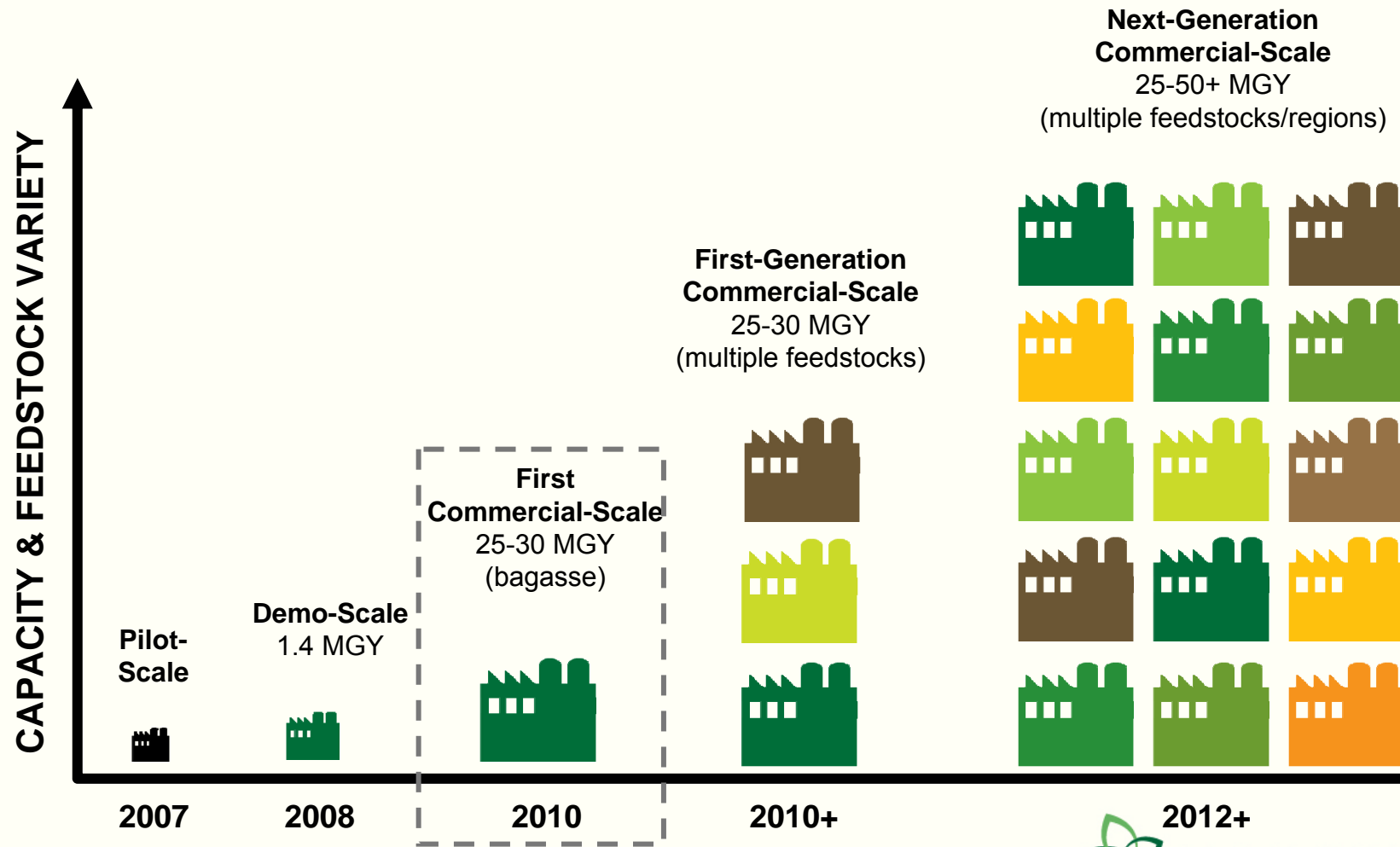


- Biodiversity
 - Unique access and patented approaches to capture nature's enormous array of microbial biodiversity
- DirectEvolution™ Technologies
 - Multiple methods to optimize enzyme performance via laboratory evolution at the gene/DNA level
- High-Throughput Screening
 - Ability to rapidly screen up to 100 MM/1B samples per day to find the ideal enzyme
- Host Engineering
 - Revolutionary heterologous over-expression of unique enzymes
- Commercial-Scale Manufacturing
 - Over seven enzyme products made at commercial scale



Biofuels Growth Strategy

1st commercial-scale cellulosic ethanol facility in 2010




Verenium's Strategy:

Five-point foundation for success


1

Exploit first-mover advantage in cellulosic ethanol production to become worldwide business partner & employer of choice



2

Build, own and operate cellulosic ethanol production facilities to maximize operational control and economic return for shareholders




3

Leverage global partnering / licensing to efficiently extend reach of technology & know-how




4

Optimize current leadership position in industrial enzymes by accelerating commercial focus and profitable growth opportunities



5

Extend leading-edge R&D capabilities across the value chain



Growing the US Ethanol Industry: Key Public Policy Issues To Be Addressed

- **Expanded Renewable Fuels Standard**
 - Pending proposal in US Senate to expand RFS from 12BGY (2014) to 36BGY (2022), mostly from CEtOH
- **Cellulosic Ethanol Production Tax Credits**
 - Cellulosic-specific credit for first volumes (e.g., up to 2BGY) offers a highly cost-effective way to create “pull” from RD&D to deployment
- **Enacting a Viable Loan Guarantee Program**
 - Authorized in EPCA 2005, it is not yet implemented but urgently needed to establish the template for future project development
- **Moving Toward a Sustainable Carbon Policy**
 - A framework that monetizes avoided carbon emissions (e.g., carbon tax or cap & trade system) will create a powerful driver for CEtOH investment



CEtOH: An International and Global Perspective

- CEtOH is a technology with global application on a highly distributed basis – a source of economic development and opportunity in developed and developing nations alike
- Global development of an ethanol industry will support critical environmental, economic and security objectives. Conditions have ripened for Henry Ford's "Fuel of the Future!"
- Verenium expects to pursue partnering and licensing opportunities for its technology on a global basis



Thank You?
Questions?

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