

Enriching lives through innovation

Huntsman Bio-based Products Initiative

Create Excellence for Our Environment, Business and Customers

Shaohua Feng, Nicholas Kob, Janos Takacs, George Smith

Huntsman Performance Products

Email: shaohua_feng@huntsman.com







- Overview of Huntsman Corporation
- Huntsman Sustainability Initiative
- Huntsman Bio-based Products Initiative
- Huntsman Examples
- Conclusion

Overview of Huntsman Corporation



- Overview
- Huntsman Growth Story
- Products and Markets
- Huntsman Sustainable Chemistry





- Huntsman is a global manufacturer and marketer of differentiated chemicals. Its operating companies manufacture products for a variety of global industries, including chemicals, plastics, automotive, aviation, textiles, footwear, paints and coatings, construction, technology, agriculture, health care, detergent, personal care, furniture, appliances and packaging.
- Originally known for pioneering innovations in packaging and, later, for rapid and integrated growth in petrochemicals, Huntsman today has 13,000 employees and operates from multiple locations worldwide. The Company had 2006 revenues of over \$13 billion.

Huntsman Growth Story

HUNTSMAN



Performance Products

Moving To Differentiated and Inorganic Businesses*



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*Upon completion of pending sale of U.S. Base Chemicals and Polymers Division

Performance Products

Leadership Positions By Business



	Product	Market Position by Volume
Polyurethanes:	MDI	#2 Globally, #1 in North America
	Polyurethane Catalysts	#2 Globally
Materials and Effects:	Epoxy Adhesives	#1 Globally
Advanced Materials	Epoxy Powder Coating Systems	#1 Globally
	Aerospace Composites	#1 Globally
	Electrical Insulating Materials	#1 Globally
	Effect chemicals	#1 Globally
Textile Effects	Process chemicals	#2 Globally
	Dyes	#2 Globally
Performance Products:	Polyetheramines	#1 Globally
	Morpholines/DGA and Gas Treating	#1 Globally
	Ethylene and Propylene Carbonates	#1 Globally
	Maleic Anhydride (MAn)	#2 Globally, #1 in North America
	Ethyleneamines	#2 Globally
	Sulfonated Surfactants	#2 in Europe
	Ethanolamines	#2 in North America
	Linear Alkylbenzene (LAB)	#2 in North America

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End Markets – Differentiated and Inorganics



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Huntsman Sustainability Initiative



- Overview
- Helping Customers Conserve
- Using Less Energy and Water
- Using Renewable Feedstocks

Sustainable Chemistry

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Initiatives:

- Using renewable feedstocks: We will increase our use of renewable materials as feedstocks
- Helping customers conserve: We will formulate products that enable our customers to find applications that benefit the environment
- Using less energy and water: We will continually improve our production processes to further reduce our carbon footprint and to conserve energy and water





Existing areas include:

- Energy efficient insulation
- Lightweight composites in automotive and aircraft
- Waterborne paint primers
- Wood preservatives that replace carcinogens
- Lubrication additives that reduce friction



Huntsman Sustainability Initiative Using Less Energy and Water



- Fostering energy-conscious culture
- Energy Management Initiative at manufacturing facilities
- Already resulting in the following:
 - Conserving energy
 - Developing more ideas for alternate energy scenarios

Huntsman Sustainability Initiative Bio-based Products Initiative



- Macrotrend
- Platform Chemicals from Biomass
- Huntsman Approach on Bio-based Products
- Huntsman's Objective

Renewable Fuels Macrotrend Driving Bio-based Product Initiative





Bioenergy and other bioprocesses will be sources of unique cost advantaged feedstocks for chemicals

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Huntsman Approach on Bio-based Products



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Be selective, manage the portfolio, deliver projects

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Biorefinery for Sustainable Development





The biorefinery based on renewable resources



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bio-processes

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Huntsman Bio-based Products Initiative



 Objective – Develop bio-based products and work with customers to identify new project opportunities

Huntsman Core Competencies

- Synthesis Capabilities
- Scale-up & Development
- Global Asset Base
- Manufacturing Excellence
- Applications Expertise



Industry, Government, Academia

- Research Capabilities
- Existing Processes
- Intellectual Property / Novel Technologies
- Manpower
- Funding (grants)

Deliver Bio-based Projects

- Feedstock Substitution
- Differentiated Products

Vegetable Oil-derived Chemicals





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Huntsman Bio-based Products Initiative -Examples



- Natural-based Surfactants
- Renewable Propylene Glycol





Natural-based Surfactants



- The cleaning market is trending to "green" ingredients, but cost remains a key criteria
- Our Household & Industrials group uses our new technology to ethoxylate low-cost vegetable oils and biodiesel
- Products are based on natural, renewable feedstocks, show equivalent performance to conventional surfactants and are readily biodegradable





The Surfactant Chemistry



Huntsman has developed a novel alkaline earth-based catalyst that enables direct insertion of alkylene oxides into vegetable oils and fatty acid methyl esters for the production of sustainably derived non-ionic surfactants



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Reduced Environmental Footprint



Standard route to non-ionic ethoxylate surfactant

Huntsman route to non-ionic ethoxylate surfactant - fewer chemical steps



Renewable Propylene Glycol from Vegetable Oil



- Production of bio-diesel from vegetable oils has lead to a glut of glycerin
- Huntsman has developed proprietary technology to convert glycerin to propylene glycol (PG)
- Technology currently in demonstration phase at our Conroe, TX, facility
- Improves our competitive position relative to others relying on petroleum based materials and offers our customers a renewable alternative



Huntsman Bio-based Propylene Glycol from Glycerin





- Huntsman is a major marketer of propylene glycol today, supplying about 125 MMlbs/yr for captive and merchant uses
- Propylene glycol is currently made from propylene oxide and water
- The bio-based route uses glycerin from the biodiesel process for processing into propylene glycol
- Huntsman expects its bio-based propylene glycol to be commercially available by 2009

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Conclusion



- Huntsman has developed a strategic business unit wholly devoted to working with our research and development professionals across our company to develop bio-based products and work with customers to identify new project opportunities
- We will use Huntsman core competencies and leverage those with 3rd party capabilities, where necessary, to chemically transform bio-based materials into value-added chemical products
- The projects we have underway or are considering are either feedstock substitution projects (making a product we make today from a bio-based material) or projects to make differentiated products, also from bio-based materials
- Huntsman has developed the technology of producing Non-ionic Vegetable Oilbased Surfactants and Glycerin-based Propylene Glycol
- www.huntsman.com/sustainable_chemistry

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