

# Ethanol 2012

Facing the Forces Changing  
the U.S. Ethanol Industry

Presented by:

The **Hale** Group  
— and its affiliates

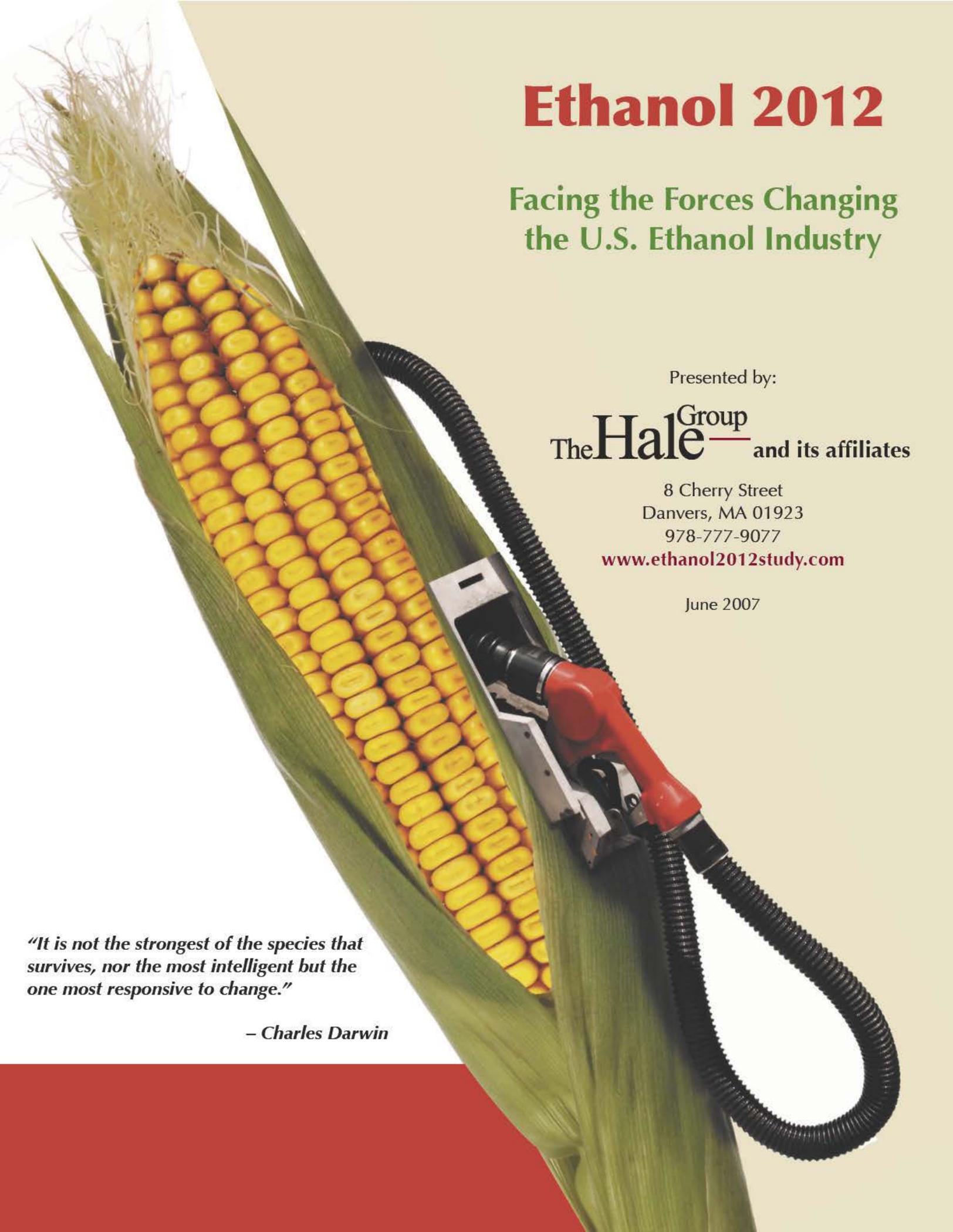
8 Cherry Street  
Danvers, MA 01923  
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*"It is not the strongest of the species that survives, nor the most intelligent but the one most responsive to change."*

– Charles Darwin



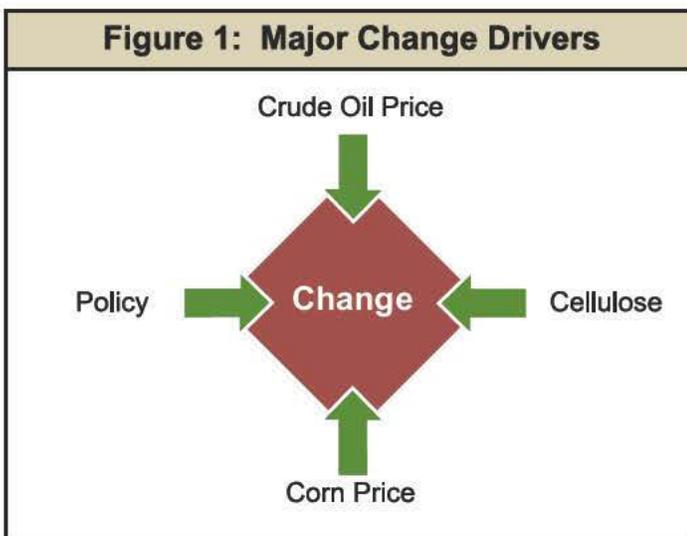
## Ethanol 2012: Facing the Forces Changing the U.S. Ethanol Industry

The U.S. ethanol industry has more than doubled during the last four years and it will more than double its capacity again during the next eighteen months as a result of new plants and the current expansion of existing plants. Despite these high rates of growth, the ethanol industry is still an infant industry that will face major challenges in the immediate future. These potential challenges include: a decline in ethanol prices due to a fall in oil prices; a sharp increase in the price of corn mainly because of the demand from the ethanol industry; less growth in demand for ethanol from the oil industry as their need for its use as an additive is fulfilled, and the introduction of new cellulose conversion technology.

The demand for alternative liquid fuels will require much larger volumes of fuel ethanol than can be supplied by corn grain alone. The emerging national emphasis will be on cellulosic materials to provide the needed volumes of renewable fuel. This transition to cellulosic ethanol will significantly affect the existing corn-based ethanol industry; however, the question remains as to whether or not the existing corn-based industry is adversely or positively affected in this transition. The **Ethanol 2012 Study** will outline the fundamental nature of the transition, how it is likely to occur, and how corn dry mills can prosper from the transition.

The forces that will have the greatest future impact on the ethanol industry are:

- ❖ The price of crude oil
- ❖ The price of corn
- ❖ Agricultural, energy, and trade policy
- ❖ The potential of converting cellulose into ethanol



No one can predict exactly how the future will unfold, only that it is likely to be turbulent. The drivers in Figure 1 have the potential to change "the way the game is played." It is possible, however, to describe several different scenarios that might occur and then develop a strategy to face each of the major scenarios. The key questions for the independent ethanol producers are:

1. How do I survive the next 3-5 years and avoid being forced to exit the business under unfavorable terms?
2. What level of capital will be required to manage the changes and challenges that are expected?

To address these questions, The Hale Group plans to carry out an **Ethanol 2012 Study** on a multi-client basis that will focus on the major strategic issues faced by participants in the U.S. ethanol industry and develop a range of strategies that companies can consider for implementation. While The Hale Group normally carries out such studies on a proprietary basis for individual companies, we believe this approach is a more cost-effective way of providing future strategies for a range of industry participants.

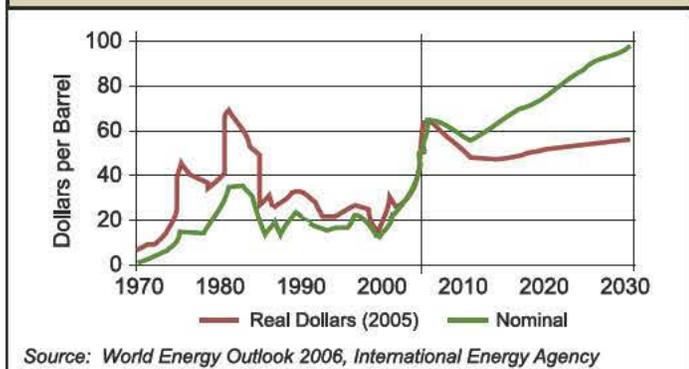
The **Ethanol 2012 Study** will assemble a group of experts in the widely disparate subject areas that are needed to understand the key forces that will shape the ethanol industry over the next few years. This study will not consider plant operational issues that we believe are well covered by other advisors to the industry.

Some of the key questions that will be addressed during this study include:

- ❖ What is the likely price of crude oil over the next few years? (Figure 2 shows projections of the International Energy Agency.)
- ❖ What factors could cause it to be higher than expected? Lower?
- ❖ What are likely components of the U.S. energy, agriculture, and trade policy during the next few years?
- ❖ What role will ethanol from corn play in that policy?
- ❖ Will the U.S. biofuels mandate be modified before 2012?
- ❖ Will ethanol imports be encouraged or discouraged?
- ❖ How quickly will the conversion of cellulose become economically viable?

Although conversion of corn stover and corn cobs may not become widespread before 2012, current industry participants should be well informed of the technologies under development. For each of the five emerging technologies

**Figure 2. Average Crude Oil Import Price**



that will convert cellulose, this study will estimate the anticipated costs of conversion after the technology has been further developed. The pros and cons of each technology along with the estimated timing of its commercialization will be included in the analysis.

Based on the analysis of the key change drivers, the study will develop a number of alternative scenarios for the future. Successful firms must be agile and prepared to respond to whatever circumstances arise in the future.

### Possible Scenarios:

The following scenarios are illustrative only, since the final scenarios in the **Ethanol 2012 Study** will be based on the research results and presented after a thorough analysis. The following scenarios represent varied, but plausible ways in which the future might unfold.

#### Scenario 1:

The world oil price declines by 20% in real terms between 2006 and 2012 per the IEA Outlook Report. Corn prices remain high at \$4 plus per bushel. The demand for ethanol in the U.S. tops out at 10% of the gasoline supply, which is an acceptable level for the oil industry. The current subsidy remains in place and the Biofuels mandate remains at 7.5 billion gallons. There is a minimum impact from second-generation cellulosic technology due to high investment and operating costs. The U.S. oil industry does not make significant investment in Biofuel production or distribution of E85.

#### Scenario 2:

The world oil price declines more rapidly than in Scenario 1 to \$35 – \$45 level due to the impact of policies aimed at reducing carbon emissions, therefore reducing demand for oil. The U.S. subsidies are maintained and the U.S. Biofuel mandate is increased to 15 billion gallons. Corn prices rise to the \$5 plus level and ethanol demand, due to the mandate, will be sufficient to clear the market. There will be an impact from second-generation cellulosic technology

with at least 250 million gallons being produced by 2012. The U.S. oil industry does not invest in Biofuel production and makes a minimum investment in distribution of E85.

#### Scenario 3:

A lack of investment by the oil industry in up-stream and down-stream capacity due to market uncertainty results in a significant shortage of oil supply with a run up in prices to the \$100 per barrel level. Ethanol demand in the U.S. grows to the level of 20 billion gallons based on favorable economics and the successful rollout of E85. The subsidies remain in place and the mandate is increased to 15 billion gallons. The U.S. oil industry becomes a serious investor in second-generation cellulosic ethanol, the technology becomes fully cost competitive with corn-based ethanol, and production reaches 500 million gallons being produced by 2012. The U.S. oil industry makes significant investment in E85 distribution, so the target of 35 billion gallons of Biofuels in 2017 can be met.

The complex interactions of diverse and complicated forces will shape the future of the ethanol industry. The U.S. economy is undergoing unprecedented changes as a result of the energy sector and the agriculture sector becoming closely intertwined. The **Ethanol 2012 Study** will bring together experts who have seldom interacted in the past. The synthesis of these diverse areas of expertise is what makes this study unique.

For each scenario, several alternative strategies will be developed that companies may implement – depending on their individual circumstances. Thus, we will cover a wide range of possible planning assumptions and industry conditions and provide a range of strategic responses that companies can consider for implementation. In this way, companies will be well prepared for what is likely to be a rapidly changing and challenging environment.

### Deliverables:

Each company subscribing to this effort will receive:

- ❖ A PowerPoint presentation of the key findings and recommendations.
- ❖ A half-day meeting with the leaders of the **Ethanol 2012 Study** and the client's leadership team to discuss findings and strategic conclusions of the study and its implications for the client's vested interests.
- ❖ A two-hour conference call with Dr. Clayton Yeutter to answer questions about the policy outlook.
- ❖ A two-hour conference call with senior energy experts of Cambridge Energy Research Associates to answer questions about the petroleum outlook. →

*Deliverables* continued from page 3

- ❖ A two-hour conference call with Dr. Bruce Dale to answer questions about cellulosic conversion technology.
- ❖ A written report of the findings, strategies and recommendations.

Subscribers have the option of contracting with The Hale Group or one of its affiliates to assist the subscriber to develop an individual strategy in greater detail.

### Target Audience:

The **Ethanol 2012 Study** is designed to meet the strategic planning needs of current ethanol producers, companies that are considering entry into the industry, financial firms that have an investment in the ethanol industry, service providers to the ethanol industry, and governmental agencies.

### Cost:

The cost of the **Ethanol 2012 Study** will be \$50,000 per participating company. The Hale Group will initiate the study after it has received 10 subscribers to this project.

### Participants and Industry Experts:

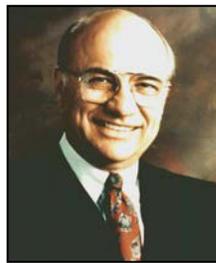
The Hale Group in association with LSC International and AP Innovations will conduct the **Ethanol 2012 Study**. The work will be led by Robert Ludwig and William Hale of The Hale Group, Ltd. who both have over 30 years of consulting experience in the Agri-Food Sector and have led many successful multi-client studies. In addition, the external advisors for the study will be the following sector specialists:

### Petroleum Expert: Cambridge Energy Research Associates



**CERA**  
An IHS Company

Cambridge Energy Research Associates (CERA), an IHS company, will assist The Hale Group in the analysis of the global petroleum markets and the role of the oil industry in the rapidly growing ethanol industry. CERA is a leading advisor to energy companies, financial institutions, technology providers, and governments. CERA delivers critical knowledge and independent analysis on energy markets, geopolitics, industry trends, and strategy. CERA's expertise covers all major energy sectors—oil and refined products, natural gas, electric power, and renewables—on a global and regional basis. CERA's team of experts is headed by Daniel Yergin, Chairman and Pulitzer Prize-winning author of *The Prize: The Epic Quest for Oil, Money and Power*.



▲ *Dr. Clayton Yeutter*

### Policy Expert: Dr. Clayton Yeutter

Dr. Clayton Yeutter will provide advice and guidance on U.S. agricultural, energy and trade policies for this study. He brings a unique perspective having served at the cabinet level as Secretary of Agriculture, U.S. Trade Representative, and Counselor to the President, and in sub-cabinet posts, under four U.S. Presidents. He is currently a Senior Advisor at Hogan & Hartson L.L.P., one of the nation's largest law firms, involved in the firm's extensive trade, food and agricultural practice.



▲ *Dr. Bruce Dale*

### Cellulose Conversion Expert: Dr. Bruce Dale, Michigan State University

Dr. Bruce Dale, Professor of Chemical Engineering and Associate Director of the Office of Biobased Technologies at Michigan State University, will provide to the study his 31 years of experience in converting cellulose to fuels and chemicals. Professor Dale is recognized as one of the top five experts in cellulosic technology in the country and has testified before Congress on biotechnology research priorities. In addition to his duties at the University, Professor Dale is an editor for professional journals and publications on biotechnology and is a member of numerous boards and committees associated with biofuels technology.

### The Hale Group, Ltd.

The Hale Group provides strategic counsel to firms in the food and agribusiness sectors. William Hale is founder of the company, and Robert Ludwig heads their agribusiness practice.

### LSC International

LSC INTERNATIONAL INC is an advisory firm to the Global Agri-Food Sector with a focus on technology and strategic issues. The firm was founded 10 years ago by John W. Power, who continues as President and Senior Advisor. The firm's web site is [www.lscintl.com](http://www.lscintl.com).

### AP Innovations

APInnovations is a consulting, engineering, and design firm specializing in grain processing, oilseed processing, and biofuels production. The company is owned by Steven Danforth and Michael Shook who each have over 25 years of experience in the field.