Next Generation Biofuels –
Trends In Global Innovation and Finance
The Tools of Biotechnology
Meet the World’s Energy Challenge
MONDAY, OCTOBER 15, 2007 – HOUSTON, TEXAS
<table>
<thead>
<tr>
<th>CONTENTS</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>LETTER FROM MAYOR BILL WHITE, CITY OF HOUSTON</td>
<td>2</td>
</tr>
<tr>
<td>LETTER FROM CONSUL-GENERAL PAUL LYNCH, BRITISH CONSULATE-GENERAL, HOUSTON</td>
<td>3</td>
</tr>
<tr>
<td>ORGANISERS</td>
<td>4</td>
</tr>
<tr>
<td>AGENDA</td>
<td>5–6</td>
</tr>
<tr>
<td>EXECUTIVE SUMMARY</td>
<td>7–8</td>
</tr>
<tr>
<td>REPORT</td>
<td>9–18</td>
</tr>
<tr>
<td>SPONSORS</td>
<td>19</td>
</tr>
<tr>
<td>SUPPORTING ORGANISATIONS</td>
<td>20–24</td>
</tr>
<tr>
<td>SPEAKERS</td>
<td>25–33</td>
</tr>
<tr>
<td>CONTACT INFORMATION</td>
<td>34</td>
</tr>
</tbody>
</table>
Greetings,

As mayor of Houston, I welcome everyone to the Next Generation Biofuels: Trends in Global Innovation and Finance Conference hosted by the Greater Houston Partnership and UK Trade & Investment at the British Consulate-General, Houston.

We are honored to be the host city for this important conference promoting next generation biofuels. Houston is proud to support innovations for economical biofuels production from a wide range of renewable resources.

Houston is America’s great city of opportunity and, as the world’s energy capital, an integral part of the global economy. Our city has a diverse economic base and is a key center of many industries, such as transportation, healthcare and research & development. Houston’s long history of innovation in the oil and gas industry uniquely positions the city nationally and internationally as a location for such a dialogue about next generation biofuels.

I hope those visiting our city for the first time will have an opportunity to share in the Houston experience, taking with you lasting impressions of the spirit, vitality and tradition that characterize our city. I hope all visitors will have an enjoyable and rewarding stay, and look forward to having you return again soon.

I commend those who have worked diligently to make this possible. Best wishes for a successful and memorable conference.

Sincerely,

Bill White
Mayor

On behalf of the British Consulate-General, I would like to extend a warm welcome and thank you for attending today’s Next Generation Biofuels Conference.

The British Government is committed to leading the world in addressing the issues of climate change. As a nation, the UK is committed to a 60 per cent reduction on its 1990 levels of carbon emissions by 2050. The recent Energy White Paper sets out the British Government’s international and domestic energy strategy for achieving these targets.

Biofuels will be a critical part of the energy mix. The UK Government recognises the importance of biotechnology in meeting global energy needs and is committed to sponsoring research and development of innovative, next generation biofuel technologies. In 2008, the British Government’s Renewable Transport Fuel Obligation (RTFO) will be introduced, stipulating that five per cent of all transport fuel should come from renewable resources by 2010. As this introduction is quickly approaching, inward investment into the UK biofuels sector is increasingly on the rise.

By encouraging biofuel production that offers the highest levels of carbon mitigation with the least amount of adverse environmental effects, the UK is creating a sustainable model for biotechnology development. Our hope is that the USA, and Houston in particular, will join in this effort.

Through a global partnership, the USA and UK can lead the way to energy independence and generate public understanding of the need to confront climate change. The UK has a track record of reducing harmful emissions while stimulating economic growth. As the energy capital of the world, Houston is uniquely suited to foster such an international relationship, and its entrepreneurial spirit will enable Texas and the greater USA to realise its position as a next generation biofuels pioneer.

Building on the success of our carbon emissions conference in January 2007 with the Greater Houston Partnership and with today’s Biofuels conference, I look forward to future UK – Houston collaborations.

Thank you to all of our sponsors and partners for their generous support, and to each of you for participating in this groundbreaking event.

Consul-General Paul Lynch
British Consulate-General, Houston
UK TRADE & INVESTMENT

WHO WE ARE
UK Trade & Investment is the lead Government organization that supports companies in the UK doing business internationally and overseas enterprises seeking to set up or expand in the UK. We work in close partnership with the English regional development agencies and the national development agencies in Scotland, Wales, and Northern Ireland. UK Trade & Investment will provide you with the support and strategic partners you need to succeed in the UK.

WHERE TO FIND US
UK Trade & Investment has an extensive global network. With commercial teams based in offices around the world, and a network of specialists throughout the UK, we are uniquely positioned to help your business across national boundaries. For more information visit us at www.uktradeinvest.gov.uk

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BRITISH CONSULATE-GENERAL, HOUSTON

British Consulate-General, Houston represents the interests of the United Kingdom. Based in Houston, Texas the Consulate-General serves a six-state region, including Texas, Oklahoma, Louisiana, Arkansas, New Mexico and Colorado.

Among the Consulate-General’s interests are the promotion of the UK’s Strategic Priorities in science and technology and public diplomacy; the promotion of inward investment and trade between the UK and the USA; media relations; and consular services.

www.britainusa.com

THE GREATER HOUSTON PARTNERSHIP

The Greater Houston Partnership traces its roots to Houston’s original Chamber of Commerce, founded in 1840. The Partnership was formed in 1989, as a merger of the Houston Chamber of Commerce, the Houston Economic Development Council and the Houston World Trade Center.

The Partnership’s principal objective is to build regional economic prosperity. It does so in a variety of ways including: lobbying for legislation that favors the region’s business community; facilitating relocations and expansions in the Houston area; international outreach initiatives, including inbound and outbound business development missions; and strategic planning.

The organization has more than 1,800 Member companies and an active 136-Member board of directors. The board and our Members at large represent a cross-spectrum of Houston’s business community in terms of sectors and company size.

The 10-county region the Partnership serves includes Austin, Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, San Jacinto and Waller Counties.

www.houston.org

AGENDA


Monday, October 15, 2007
Intercontinental Houston - 2222 West Loop South - Houston, Texas 77027
Moderated by: Rob Toker, Head of UK Trade & Investment, Texas & Florida

7:00 – 8:00 AM
REGISTRATION, CONTINENTAL BREAKFAST & NETWORKING

8:00 – 8:30 AM
OPENING REMARKS AND INTRODUCTION TO MAYOR BILL WHITE
Ambassador Linnet F. Deily, Former Deputy, USTR, Former Ambassador to the WTO, H Member, Greater Houston Partnership Board of Directors

WELCOME FROM CITY OF HOUSTON
Mayor Bill White, City of Houston

8:30 – 9:00 AM
BIOFUELS: ENERGY SECURITY, CLIMATE RISK AND OIL & GAS MARKETS
Matt Partridge, Senior Biofuels Consultant, Wood Mackenzie, Inc.

9:00 – 9:15 AM
NETWORKING COFFEE BREAK

9:15 – 10:00 AM
MORNING KEYNOTE AND Q&A
James Fawley, Director of Strategy, BP, Global Biofuels

10:00 – 11:15 AM
TECHNOLOGY TRENDS: LINKING LIFE SCIENCES AND ENERGY
CHAIR AND OPENING KEYNOTE ADDRESS
Dr. Aristides Patrinos, President, Synthetic Genomics, Inc.

This panel will examine industrial biotechnology trends and new research developments.

PANEL MEMBERS:
- Dr. Ramon Gonzalez, William W. Aken Assistant Professor, Rice University
- Dr. Edward Green, CEO, Green Biologics
- Dr. Robert Harris, President & CEO, Houston Advanced Research Center
- Ricardo Rodriguez, CEO, Bioverda US Holdings, Virgin Bioverda

11:15 – 11:30 AM
NETWORKING COFFEE BREAK

11:30 – 12:30 PM
FINANCE TRENDS IN BIOFUELS UPSTREAM INFRASTRUCTURE
This panel will examine the characteristics of viable biofuels projects and future growth opportunities.

CHAIR AND OPENING ADDRESS
Jonathan Kim, Senior Vice President, The Royal Bank of Scotland

PANEL MEMBERS:
- Pearce Hammond, Vice President of Institutional Research, Simmons H Company International
- Chris Maxwell, Bioenergy Specialist Advisor, One NorthEast, The North of England Inward Investment Agency
- Bill Swanson, Partner, Lucke Lord Biosell & Liddell LLP
- Dan Watkins, Managing Director, BPL Mercury
**KEYNOTE LUNCHEON**
Matt Simmons, Chairman, Simmons & Company International

**TEXAS’ ROLE IN THE BIOFUELS MARKET**
Texas, home to the world’s energy capital, is uniquely positioned to establish a leadership position in the growing biofuel economy.

**CHAIR AND OPENING ADDRESS**
Paul Dickerson, Chief Operating Officer, Office of Energy Efficiency and Renewable Energy, U.S. Department of Energy

**PANEL MEMBERS:**
- Dr. Richard E. Bills, Associate Dean, College of Engineering, The University of Texas at Arlington
- John Burke, Manager, ConocoPhillips
- Matthew Butler, President, Zeenergy Bio Fuel, LLC
- Ken Herr, Chairman & CEO, Nova Biosource Fuels, Inc.
- Rob York, Executive Vice President, BioSelect

**AFTERNOON KEYNOTE**
Dr. Mark Holtzapple, Professor, Texas A&M University

Dr. John Ashworth, National Renewable Energy Lab

Justin Bzdek, Co-Founder and Vice President, Research & Development, Blue Sun Biodiesel, LLC

Doug Herndon, CEO, Solux Biofuels

Dr. Mark Holtzapple, Professor, Texas A&M University

**FEEDSTOCK AND INFRASTRUCTURE**
John Mahon, Director – Business Development, Kinder Morgan

**AFTERNOON KEYNOTE**
Ian Waller, Managing Director, FiveBarGate Consultants, Ltd., The North of England Inward Investment Agency

**CLOSE AND NETWORKING RECEPTION**

**AGENDA**

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>12:30 – 1:45 PM</td>
<td><strong>KEYNOTE LUNCHEON</strong> Matt Simmons, Chairman, Simmons &amp; Company International</td>
</tr>
<tr>
<td>1:45 – 3:00 PM</td>
<td><strong>TEXAS’ ROLE IN THE BIOFUELS MARKET</strong></td>
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<td><strong>CHAIR AND OPENING ADDRESS</strong></td>
</tr>
<tr>
<td>3:00 – 3:15 PM</td>
<td><strong>NETWORKING BREAK</strong></td>
</tr>
<tr>
<td>3:15 – 4:30 PM</td>
<td><strong>GAME CHANGERS: MOVING INTO THE NEXT GENERATION</strong> This panel will feature new and innovative bioenergy technologies and examine future growth trends and biofuels role in the global energy industry.</td>
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<td><strong>CHAIR AND OPENING ADDRESS</strong></td>
</tr>
<tr>
<td></td>
<td><strong>PANEL MEMBERS:</strong></td>
</tr>
<tr>
<td>4:30 – 5:00 PM</td>
<td><strong>FEEDSTOCK AND INFRASTRUCTURE</strong></td>
</tr>
<tr>
<td>5:00 – 5:30 PM</td>
<td><strong>AFTERNOON KEYNOTE</strong></td>
</tr>
<tr>
<td>5:30 PM</td>
<td><strong>CLOSE AND NETWORKING RECEPTION</strong></td>
</tr>
</tbody>
</table>

**EXECUTIVE SUMMARY**

**NEXT GENERATION BIOFUELS CONFERENCE**
In October 2007, UK Trade & Investment at the British Consulate-General, Houston, in collaboration with the Greater Houston Partnership, hosted a conference on Next Generation Biofuels in Houston, Texas. The conference, Next Generation Biofuels - Trends in Global Innovation and Finance: The Tools of Biotechnology Meet the World’s Energy Challenge, addressed the role of current biofuel technology in the energy market and the potential of next generation biofuels—those fuels derived from non-food feedstock including lignocellulosic biomass and algae—to meet rising global energy demand.

Over 300 attendees, including industry, science, academic and policy leaders, gathered at the all-day conference to discuss a range of opportunities and risks associated with fuel supply, protect the environment and production of second generation biofuels.

**UK-TEXAS PARTNERSHIP**
The conference was supported by the leadership of both American and British officials. City of Houston Mayor Bill White and HM Consul-General Paul Lynch welcomed the conference participants and stressed the importance of developing an international relationship that promotes environmental responsibility and economic sustainability. Limnet F. Delly, former Ambassador to the World Trade Organization, provided background on energy history in Texas and viewpoints on Houston’s current leadership position.

For many decades, Texas has played an important role in the energy industry. The world’s first giant oil fields were discovered in Texas, and the Texas Railroad Commission was the world’s first oil cartel. Today, Texas is home to many of the largest global oil and gas companies, and Houston is often touted as the energy capital of the world. Leveraging its history and position, Texas has a chance to retain its energy leadership by embracing the transition to a new energy era that includes sustainably produced biofuels as one of its key pillars.

The British Government is committed to leading the world in addressing the issues of climate change. As a nation, the UK is committed to a 60 per cent reduction on its 1990 levels of carbon emissions by 2050. The recent publication of “Meeting the Energy Challenge”, an official white paper from the British government, highlights this commitment. The UK Government recognizes the importance of biotechnology in meeting global energy needs and is committed to sponsoring research and development of innovative, next generation biofuel technologies (also referred to as second generation biofuels). In 2008, the British Government’s Renewable Transport Fuel Obligation (RTFO) will be introduced, stipulating that 5 per cent of all transport fuel should come from renewable resources by 2010.

Through a global partnership, the USA and UK can lead the way to energy security and encourage the production of innovative renewable fuel sources.

**BIOFUELS: A VIEW FROM MANY PERSPECTIVES**
The conference was comprised of a series of panel discussions and keynote speeches. As representatives of multinational corporations, early-stage technology firms and leading research institutions, conference speakers provided distinct and critical viewpoints of the biofuels industry.

During the morning segment, Matt Partridge of Wood Mackenzie presented three future scenarios for biofuels: a “bio-boom”, a “bio-balance” and a “bio-bust”. Which scenario prevails will depend largely on the price of oil, the environment, energy security, rural development and government policy. James Fasley, Director of strategy for BP Global Biofuels, followed up by identifying BP’s primary objective in developing next generation fuel sources: to create greater diversity in the fuel supply, protect the environment and support rural communities. Through its investment in the Energy Biosciences Institute, BP is working to accelerate research into new cellulosic fuel production methods.

Discussion during the “Technology Trends: Linking Life Sciences and Energy” panel focused on the importance of life science technologies in the advancement of biofuels. From DNA sequencing and genomics to life cycle analysis, linking life sciences and energy can greatly enhance biofuels production and conversion processes. The “Finance Trends in Biofuels Upstream Infrastructure” panel—comprised of lawyers, bankers and investment—provided valuable insights into the search for new technologies and the factors used to evaluate the potential risk of any project within the current regulatory environment and volatile market.

Matt Simmons, Chairman of Simmons and Company International, provided the luncheon keynote presentation, “Can We End Our Addiction to Oil? Do We Need To?” Mr. Simmons posed that the enormous international demand for fuel energy has contributed to the nearing of a peak in oil supply. Fuel efficiency, combined with the development of renewable fuels, will play an integral part in confronting peak oil.

In the afternoon, the “Texas’ Role in the Biofuels Market” panel discussed Texas’ energy leadership and strong existing agricultural industries. In the final panel, “Game Changes: Moving into the Next Generation”, topics included new biofuel production technologies including plant and enzyme engineering, thermochemical pathways for fuel production, the development of a zero carbon emissions bioenergy, advancements in algae oil production and technologies for producing lignocellulosic ethanol.

Addressing fuel distribution’s impact on biofuel adoption, John Mahon of Kinder Morgan suggested that significant changes in fuel transportation infrastructure must be made as the biofuels industry continues to grow. In his speech, Mr. Mahon even suggested that the US freight railway network currently provides the cheapest option for transporting biofuels until new pipelines can be built. Providing the final keynote speech of the day, Ian Waller of FiveBarGate Consultants represented the North of England Inward Investment Agency. As he noted, current UK policy includes evaluating biofuels on their environmental impacts, in turn creating new market opportunities for companies that truly benefit the environment.
EXECUTIVE SUMMARY

Environment, security and economic development were repeatedly cited throughout the conference as key drivers to biofuels development. While the conference speakers held differing views about which feedstock or production process will prevail as the most efficient or most promising, the group overwhelmingly agreed that the current conventional approach to biofuels production in the USA—converting corn into ethanol—is neither scalable nor sustainable. In the opinion of many of the conference attendees, panelists and keynote speakers, second generation biofuels will play a significant role in any future global energy solution and present strategic opportunities for both the UK and USA.

REPORT

NEXT GENERATION BIOFUELS - TRENDS IN GLOBAL INNOVATION AND FINANCE: THE TOOLS OF BIOENGINEERING TO MEET THE WORLD’S ENERGY CHALLENGE

Introduction

UK Trade & Investment at the British Consulate-General, Houston and the Greater Houston Partnership hosted the Next Generation Biofuels conference on October 15, 2007, at the InterContinental Hotel in Houston, Texas. The conference was moderated by Rob Toker, Head of Trade and Investment for Texas and Florida at the British Consulate-General, Houston. He introduced the panels and spoke briefly about the opportunity that a new biofuels market presents for trade and investment in both the UK and USA. The all-day conference drew a crowd of over 300 industry, academic, science, and policy leaders. Presentations covered topics ranging from insiders’ views on finance and infrastructure to state-of-the-art biofuel conversion technologies and novel biological processes for feedstock production. Although the event’s speakers came from diverse backgrounds, the group was in general agreement that today’s biofuel production approach is neither scalable nor sustainable and that second generation biofuels will be a significant component of any solution to the need to find sustainable, secure and environmentally friendly sources of energy.

Throughout the day, participants highlighted three key drivers to biofuels advancement: environment (specifically, concerns about climate change), security and economic development. Many participants focused on biofuels’ potential to supplant greenhouse gas emitting fossil fuels. Participants also discussed the importance of biofuels as a domestic energy source that can displace imported petroleum and thus decrease energy security risks. Other participants highlighted the potential that biofuels offer for economic growth in rural communities and developing countries.

While the aforementioned drivers are important, several experts noted that the price of oil will have the most significant effect on the market penetration of biofuels. While the price of oil might remain high due to natural market forces, carbon taxes or other governmental policy levers for combating greenhouse gas emissions could be used to strategically drive the price of oil higher and therefore accelerate the adoption of biofuels. According to the tenor of the speakers and the audience, such a scenario would be a welcome proposition.

The remaining hurdles to widespread use of biofuels include feedstock production, regulation, distribution infrastructure, fuel production and fuel use. For example, since feedstock production accounts for a majority of the cost and environmental impact of biofuels, producing enough feedstock cheaply and sustainably is one of the largest barriers to adoption. Proper regulation, uniform fuel standards, and a clear legal framework are required for producers, end users and for fuel transportation and distribution. Infrastructure for distributing biofuels across the country and the globe will need to be developed through extensive capital investment and technological advances. Furthermore, technological advances are necessary for efficient fuel production from a range of feedstock and for fuel use in transportation or electricity generation without undue impacts on emissions or wear-and-tear on vehicles.

Notably, the conference originated from a point of consensus that the current conventional approach to biofuels production in America—converting corn into ethanol—is not a viable replacement for fossil-fuel-derived liquid fuels as it is expensive and has built-in production limits that cannot meet national targets for renewable liquid fuels. However, all speakers agreed on the importance of biofuels as a component of the global energy solution and therefore optimistically anticipated the transition to next generation biofuels. These second generation fuels are expected to have better technical specifications for energy content and transportability while at the same time avoiding many of the environmental and moral conflicts associated with current production methods and feedstock sources.

Welcome and Opening Speakers

Linnert F. Dely, former Deputy of the US Trade Representative (LSTR), former Ambassador to the World Trade Organization (WTO) and member of the Greater Houston Partnership Board of Directors, opened the conference with a short discussion about the history of energy in Texas and Houston’s role in this critical industry. Mr. Dely then introduced Bill White, Mayor of the City of Houston.

Mayor Bill White (left) and HM Consul General Paul Lynch (right) provided opening remarks and highlighted opportunities for the City of Houston and the UK to address global climate change and energy security in partnership.

Mayor White welcomed the participants to his city and spoke of Houston’s current and future role in biofuels. He observed that the city’s expertise in chemical and process engineering is directly applicable to biofuels and positions Houston as a leader in this field. Importantly, he noted that many claims about biofuels have been exaggerated.

In the context of decreasing petroleum production and increasing oil prices while exploration and development costs have soared, Mayor White assured the audience that oil won’t run out tomorrow, but that a substantial, long-term change in the world’s liquid fuels systems is coming. In closing, Mayor White said the USA has the resources, both agricultural and technological, to profitably and proactively manage this transition.
Paul Lynch, Her Majesty’s Consul-General, welcomed the participants to the conference and highlighted the event’s focus on climate change and energy security. He discussed the British government’s commitment to climate change leadership, pointing to the recent publication “Energy of the Future” and highlighting its outlines its path to addressing the energy question. The UK is investing heavily in biofuels research and development. The government has mandated that 5 per cent of transport fuel come from renewable sources by 2010 and that carbon dioxide emissions must be cut by more than a quarter of 1990 levels by 2020. He noted that current biofuel technology is inadequate and that a pathway to renewable and affordable biofuels needs to be found. The UK hopes that the United States—anes Texas in particular—will lead the way to new and better biofuels. A future with a strong biofuels market will be accomplished not only through leadership, but also through international partnerships, placing significance on the relationship between the UK and the USA, specifically Texas.

Matt Partridge, Senior Biofuels Consultant at Wood Mackenzie, gave an introduction to biofuels with a discussion on energy security, climate risk and the oil and gas markets. At the outset, he identified the positive and negative aspects of biofuels and then discussed what he believes to be the key drivers for further biofuels development: the environment, energy security, rural development and government policy.

The environment may benefit from the use of biofuels through the lowering of greenhouse gas (GHG) emissions by displacing fossil fuels, improvements in vehicle performance and the elimination or reduction of the use of toxic or non-biodegradable fuels. While these potential environmental benefits are desirable, concerns about water use, deforestation, toxic run-off and overall sustainability of biofuels also exist. Many of these concerns, Mr. Partridge noted, are related to our current method of producing ethanol from corn, which is regarded as an inferior method of biofuels production; new production technologies and different feedstock may make biofuels an unequivocal advantage for the environment.

Regarding energy security, Mr. Partridge discussed how biofuels allow a diversification of energy sources and a reduction of dependence on OPEC and NOC countries for fuel. However, he noted that this shift from relying on foreign oil to using domestically produced biofuels would require, according to industry estimates, US$5+ real oil prices in order for many biofuels to be cost-competitive with fossil fuels. Biofuels may have a significant impact on the economies of rural areas and developing countries due to such areas’ dependence on agricultural products for feedstock, but it is unclear if this impact will be entirely positive or negative.

Mr. Partridge then discussed how the aforementioned drivers are influencing government policy. The EU has mandated that 5.75 per cent of transport fuels come from biofuels by 2020 and that this biofuel share to increase to 10 per cent by 2020. The USA has stated a goal of producing 7.5 billion gallons of renewable fuels by 2022 with new legislation expected to increase this target soon. Technology development plays a crucial role in addressing logistical and harvesting biofuel production. Yields of biomass crops must be improved as well as the ability to convert more components of the plant into an energy source. BP hopes for an increase in crop yield of 25–50 per cent over the next 5–10 years, which will allow into new production methods from bioethanol was recently accelerated by BP’s investment in the Energy Biosciences Institute (EBI), a partnership between BP, the University of California at Berkeley, the Lawrence Berkeley National Laboratory and the University of Illinois at Urbana-Champaign. BP is also actively working with Shell Biotechnology to develop methods for processing lignocellulosic biomass into ethanol.

Current biofuels have proven difficult to integrate into existing liquid fuel infrastructure. Mr. Fawley observed that future fuels should decrease the risk of corrosion or deposit formation both in storage and in vehicles using such fuels. They are expected to also be easier to incorporate into the existing fuel infrastructure as current biofuels and other fuels in vehicles at higher percentages of the fuel mix. Currently, 10 per cent ethanol blends represent the highest alcohol content that can be used in conventional engines. Bioethanol, a new fuel that BP is researching and producing in Hull, UK, has 86 per cent of the energy content of gasoline, is easy to blend, is non-corrosive and has a low affinity for water.

Regulations in the biofuels market are necessary, Mr. Fawley concluded, but need to be determined by fuel performance. Such laws should focus on GHG emissions and sustainability requirements and should be aligned with fuel specifications. Thus, regulations should be market-based and specify the ends, not the means, of fuel production.

In summary, BP is cautiously optimistic about the future of biofuels but considers them a key strategic element in the low carbon energy agenda along with renewable and alternative power sources.

Technology Trends: Linking Life Sciences and Energy

The morning panel, “Technology Trends: Linking Life Sciences and Energy”, focused on technology trends in the life sciences and their importance in expanding the biofuels market. Topics included genetic engineering of microorganisms to metabolize biological feedstock into biofuels, new biobutanol plants and novel methods for recycling glycerin from biodiesel production. This session highlighted the important role of life science research and technology in making biofuels a practical alternative to traditional energy sources.

Dr. Anastides Patrinos, President of Synthetic Genomics, Inc., began his presentation with an overview of climate change and its manifestations. All of the available evidence points toward the reality of global warming, Dr. Patrinos stated. Carbon dioxide readings from Hawaii have demonstrated an increasing trend of this gas in the atmosphere. Likewise, the global land-ocean temperature anomaly chart trends upward, and around the world the heat waves and extreme weather events are increasing in severity. Ice core time series samples have demonstrated a clear connection between carbon dioxide concentrations in the atmosphere and temperature fluctuations.

Dr. Ramon Gonzalez, the William W. Akers Assistant Professor at Rice University, opened the panel discussion with a review of the US’s anaerobic fermentation of glycerol to produce biodiesel and biochemicals. Dr. Gonzalez began an overview of biofuels and potential feedstocks and then narrowed the conversation to biofuels and the problem of dealing with the glycerol byproduct. The recent increase in biodiesel production has led to a sharp decrease in the price of glycerol. Biodiesel producers rely on the sale of glycerol at high prices for the economic viability of their business and many are therefore looking for new uses for glycerol.

In light of this evidence, Dr. Patrinos expressed concern that the world may be approaching a tipping point where climate change would produce non-linear temperature changes around the planet.

To avoid such a situation, net carbon dioxide emissions must fall to zero. This action, though, would leave an enormous gap between the goal emissions and the expected carbon dioxide emissions in the future. A smaller gap may exist in extracting groups such as fossil fuels, energy intensity, nuclear energy and renewable technologies are realized to supplement global energy resources. These advancements would still require “gap technologies” such as carbon capture and sequestration, hydrogen energy sources and biotechnologies to reduce the disparity between estimated renewable fuel contributions and the goal of net zero carbon emissions.
Dr. González has developed a process that uses glycerol as a feedstock for anaerobic fermentation to produce reduced chemicals and fuels. This process has lower capital costs than the fermentation of corn, producing ethanol at US$0.66 per gallon. If this technology proves successful, biodiesel production could become significantly more profitable.

Green BioLogics (GBL) is an industrial biotech company founded in 2003 to produce biofuels and chemicals. Dr. Edward Green, CEO, presented on the production of butanol and its byproduct, acetone, as well as GBL’s efforts to reduce the costs associated with the synthesis of these chemicals. GBL views butanol as a superior fuel for various reasons. Butanol and its acetone derivative have a secondary market in the polymers and plastics industry and the production of butanol is sustainable and environmentally friendly.

GBL’s goal is to deliver a complete, cost-effective process solution for butanol. In order to fulfill this goal, GBL is focusing on cost reduction. GBL uses process inefficiencies and byproducts as butanol feedstock to decrease expenses. Processing costs will be reduced by improved process efficiency through genetic engineering and fermentation optimization. GBL will first target readily accessible feedstock and exploit chemical markets. In the mid term the company plans to retrofit grain ethanol plants to produce butanol and thus exploit fuel markets. Over the long term GBL will put the biofinery concept into practice to produce cellulosic butanol as well as exploit the fuel and chemical markets.

The CEO of the Houston Advanced Research Center, Dr. Robert Harris, spoke next. Dr. Harris’ presentation focused on the importance of conducting life cycle analyses on any biofuels used presently or in the future. Such an analysis will help reduce the importance of conducting life cycle analyses on any biofuels used presently or in the future. Such an analysis will help reduce the feedstock and their economic viability in the fuel market. The energy market, Mr. Rodriguez believes, is a commodity market. Investors in the energy market must consider the energy content of the fuel, supply and demand and a possible future carbon dioxide tax. Diversification of fuel sources is the best way for a company to mitigate risks and to ensure energy security.

President Bush has set a goal for ethanol and biofuel production in the USA to reach 36 billion gallons by 2017. Fuel options for reaching such goals should be prioritized on the basis of their "pecking order," which Mr. Rodriguez defines as ethanol from sugar followed by corn ethanol and cellulosic ethanol. Ethanol from sugar, produced in Brazil, is the cheapest option but is primarily used for domestic consumption in Brazil. The 36 billion-gallon goal could be met if corn ethanol were to increase from the six billion gallons a year currently produced to 15 billion gallons a year and if the nation could produce 17 billion gallons of cellulosic ethanol by the target date. New seeds and agricultural practices may benefit corn ethanol and could help reach the 15 billion-gallon target. Cellulosic ethanol, which can be extracted from a wide variety of readily available feedstock, may contribute to this goal and is projected to be commercialized in the next three to five years.

Innovations for the biodiesel market are focused on feedstock. Algae, a new feedstock requiring fewer resources to grow and producing high oil yields, is extremely promising. Several companies are developing methods to grow algae and commercialize it as a source of biodiesel. Other new crops with lower resource requirements, such as jatropha, are also being researched for biodiesel applications. Algae is a promising feedstock and processing technologies for biofuels. Mr. Rodriguez emphasized that the biofuels industry should concern itself with the ability to store its products and the retail and wholesale marketing of biofuels.

Biologists have made great advances in extracting useful fuels from biomass. Nonetheless, there is still a need to ensure that such fuels are truly environmentally benign and to continue developing more efficient fuels and methods for obtaining biofuels. Though some panelists expressed interest in improving first generation fuels, others sought to develop and expand the market share of second generation fuels such as biobutanol. Overall, the members of this panel expressed the important role of the biological sciences both in developing biofuels and in making them economically feasible for widespread use.

The major biofuel project development and feedstock issue is the lack of a market for long-term off-take from the lack of price stability within the industry. Solutions to this problem include implementing tolling structures, crush margin hedges and decreasing borrowing in the production of biofuels. Pricing terms and working capital financing are other legal issues that arise in biofuel production. Fixed quantity and take or pay conditions are important in biofuels production contracts. Understanding when the title is transferred is necessary for production of feedstock and fuel production, especially for insurance and risk issues associated with production. Mr. Swanstrom noted that having a wide variety of feedstocks will calm price variability. Various tax incentives offer assistance for biofuel project development including the Texas Biofuels Incentive Program and national incentive plans. Other legal issues include development in nonattainment areas and restrictions on exporting biofuels.

Finally, Dan Watkins of DFJ Mercury Venture Partners gave a presentation titled "Financing Environment for Early Stage Biofuel Deals." DFJ Mercury Venture Partners is an early stage venture capital fund and a partner firm in the Draper Fisher Jurvetson global network. DFJ Mercury invests in information technology, life sciences and clean technology. Typical companies seen by DFJ Mercury offer incremental improvements to ethanol and biodiesel production and innovations to biofuel production including new ways to use biofuel waste streams.

What makes a project fundable? Mr. Watkins gave several characteristics of projects that offer good funding potential including: capital efficiency and a technological advantage over other projects, innovative high-risk ideas, global strategy and geographical diversification. DFJ Mercury emphasized the importance of technological advantages noting that the innovation that gets the job done fastest and cheapest will win.
After the panel members gave their individual presentations, the floor was open to questions from the audience. On the topic of speed-to-market and getting into the business world, Mr. Kim offered some insight noting that the first design to accomplish a goal is often the most impressive. Lenders and investors are most concerned with the biofuels industry growing, new technologies emerge, so those seeking investment in biofuels technology that can confront new technologies that are likely to emerge in the future. Lenders and investors want to find a prevailing technology. Mr. Watkins added to this by remarking that there is always room for new technologies, but as the industry grows there will be fewer opportunities for new developments.

Another question posed by the audience concerned management skills needed in early life sciences technology teams. The attractiveness of biofuels markets appeals to great managers to start-up companies; noted Mr. Watkins. Audience members also wanted to hear about the policy developments in regards to biofuel development. Mr. Hammond explained that Washington prefers ethanol and gasoline mixtures to oil consumption. In conclusion, Simmons shared a scenario of seven years. Peak oil is defined as the point in time at which the world will use half of current production. If the world is nearing a peak in oil supply, alternative fuels “take on a more ominous urgency.”

Finally, Mr. Simmons argued that the USA should be preparing to deal with peak oil, stating that a “war footing” could take five to seven years. Peak oil is defined as the point in time at which the maximum global petroleum production rate is reached, after which the rate of production enters its ultimate decline. He suggested that fuel efficiency could be an integral part of this plan, citing miles traveled by the average American as the biggest contributor to oil consumption. In conclusion, Simmons shared a scenario of the future that shows biofuels growth making up a small, yet important, portion of the gap between inherent oil need (demand) and declining supply.

Mr. Simmons went on to highlight the huge demand for fuel ethanol in the USA and around the world, with an emphasis on transportation energy requirements. In the USA, 98 per cent of transportation energy is provided by gasoline, diesel, jet fuel and bunker oil and requires 65 per cent of all USA oil demand. The USA consumes 13 million barrels of fuel (gasoline and diesel) per day while the rest of the world uses only 3 to 3.5 times as much. Globally, 800 million vehicles are on the road, with 50 million added per year; this growing vehicle population will require energy in the form of liquid fuels to fit existing infrastructure. Citing the growth in oil demand over the last century and forecasts for 2030 of 120–130 million barrels per day, Mr. Simmons questioned whether this growth can be sustained as supply nears peak output. If the world is nearing a peak in oil supply, alternative fuels “take on a more ominous urgency.”

Texas’ Role in the Biofuels Market

For many decades, Texas has played an important role in the energy industry. The world’s first giant oil fields were discovered in Texas, and the Texas Railroad Commission was the world’s first oil cartel. Today, Texas is home to four of the largest global oil and gas companies, and Houston is often touted as the energy capital of the world.

Leveraging its history and position, Texas has a chance to retain its energy leadership by transitioning to a new energy era that includes sustainably produced biofuels as one of its key pillars. The conference offered a discussion of Texas’ role in the biofuels sector by a panel of leaders in the industry.

The panel was chaired by Paul Dickerson, Chief Operating Officer of the Office of Energy Efficiency and Renewable Energy for the United States Department of Energy. Mr. Dickerson began his presentation by discussing opportunities in the Texas biofuels industry due to the current energy industry presence and agricultural resources. Currently, Texas has seven ethanol plants under construction. During the 2007 State of the Union Address, President George Bush introduced the “20 in 10” plan to reduce consumption of energy in the USA by 20 per cent in ten years. To meet these goals, investments of US$1.4 trillion by 2030 are needed to fuel the biofuels industry. Private sectors are investing between $5 and 10 billion dollars from now to 2030.

Mr. Dickerson closed with the assertion that by working together now, future generations will look back and see how we successfully changed our energy practices. Although the US Federal government has a prominent role to play in the energy industry, he emphasized that states need to lead these changes for the nation by creating an integration of government policy, technology and investments in the biofuels industry.

The next panel member offered a unique perspective on academic research and developments in biofuels taking place in Texas. Dr. Richard Billo serves as Associate Dean of the College of Engineering at the University of Texas at Arlington; his presentation entitled “Rapid Production of High Quality Biodiesel Using Microreactors” highlighted research occurring at the university. Microreactor technology is biodegradable, reduces emissions of greenhouse gases and reduces USA dependence of foreign sources of oil. Cost of production is still high especially for biofuels, transportation, labor and energy and utilities. The University of Texas at Arlington is working to improve microreactor design in order to reduce costs.

Researchers have developed a compact microreactor that Dr. Billo described as the size of a small suitcase. The small design takes advantage of a fast reaction by increasing the surface area to volume ratio in the reactor and lowers capital and transportation costs. Designing the microreactor required an analytical and experimental interdisciplinary study of fluid mechanics, heat and mass transfer, chemical reactions, surface effects, material science and microfabrication. Traditional reactor conversion rates are about 70–80 per cent reaction in 1000 seconds, while the microreactor accomplishes about 90–93 per cent reaction in 900 seconds. Challenges faced on the project include incorporating alternative feedstock and developing a low cost recovery of byproducts.

Lou Burke, manager of the ConocoPhillips biofuels group, was the next panelist to present. ConocoPhillips is interested in biofuels to diversify fuel supply, to encourage energy efficiency, to invest in new technologies and to find processes that protect the environment. ConocoPhillips blends biodiesel, producing 10 per cent of all blended ethanol in the United States. ConocoPhillips also produces renewable diesel in Ireland from soybean feedstock. Relationships have been established with agriculture producers, such as Tyson, for renewable diesel production. Mr. Burke expressed the Tyson relationship as a nice marriage between agriculture and energy, in contrast to other agricultural feedstock that compete with the food industry. Another advantage is the low-carbon energy relation for ConocoPhillips is with the agricultural process company Archer Daniels Midland. With developing policies setting national biofuel goals, Mr. Burke expresses infrastructure as being the biggest impediment for continued growth to reach national goals.

Ken Herr, Chairman and CEO of Nova BioSourse Fuels, Inc., presented next. Nova BioSourse Fuels is a publicly traded company that produces biodiesel throughout the country. Mr. Herr discussed the environmental benefits of biodiesel and how his company produces biodiesel using conventional triglycerides from fatty acid methyl esters (FAME), which is derived from vegetable oils. He explained that biodiversity includes being biodegradable and having high lubricity. Mr. Herr highlighted the need to find new feedstock for biodiesel and suggested that algae is a promising possibility.

The last panelist was Rob York, Executive Vice President of BioSelect. BioSelect’s Galveston plant began operations in May 2007 with a capacity of 30 million gallons annually. Worldwide vegetable oil use has more than doubled in the last 10 years, creating a tight competition between food and energy demand. Mr. York pointed out that the food versus energy fight will be won by food. Soybean use for biodiesel is rising in the United States while soybean oil is still being used for biodiesel. The soybean market is feeling pressure on two fronts: the cost of soybeans has become very expensive compared with fossil fuels and the input prices are very high, so processing margins are being squeezed tighter. Mr. York highlighted the keys to producing long-term success for biodiesel: successful commercialization of feedstock that does not compete with food and obtaining site location and logistics superiority.
Texas’ role in biofuel development has the potential to be very significant in the future. Panelists discussed the challenges for Texas in biofuel production for the future including political and policy incentives needed for commercialization, feedstock growth and development and production cost reduction. Texas biofuel developments are currently in their infancy, so this report will mainly focus on the current research and in collaborations and growing initiatives in large corporations. By focusing on strengths in agriculture and technology, Texas can become a leader in the biofuel industry.

**Game Changers: Moving Into the Next Generation**

In the final panel, “Game Changers: Moving into the Next Generation”, several new and innovative bioenergy technologies were presented, along with assessments of the role of biofuels in the global energy market. Panelists discussed various new technologies for biofuels production including plant and enzyme engineering, thermochemical pathways for fuel production, the development of a zero carbon emissions bio refinery, new developments in algae oil production and technologies for producing lignocellulosic ethanol.

Dr. Andrew R. Barron, the Charles W. Duncan, Jr. – Welch Chair of Chemistry and Associate Dean of the Weiss School of Natural Science at Rice University, provided the opening address for the final panel with an overview of energy research plans and activities underway at Rice University. The philosophy for energy research and development at Rice University is summarized as follows: “Building the bridge to a sustainable, affordable, and secure energy future.” Crosscutting research is underway in the area of nano applications, biomass to energy and chemicals, and cutting edge science and engineering applied to fossil fuels.

In his presentation, “Biofuels Technology Overview”, Dr. John Adworth, the Interim Director of The National Bioenergy Center at the National Renewable Energy Laboratory, identified four questions: Why are certain types of biomass difficult to transform into biofuels? What are the major pathways to fuels? Is there enough biomass to have an impact on USA transportation fuels? What is the range of bio-based fuels and where do they stand on the commercialization continuum?

To answer the first question, a brief lesson in plant science helped to illustrate the difficulty in extracting sugars from biomass; particular emphasis was placed on the challenge of extracting these sugars from lignocellulosic biomass. Two primary conversion routes to biofuels exist: “biochemical conversion”, or transformation of biomass through intermediates (sugars), and “thermochemical conversion”, or reduction of biomass to carbon monoxide and hydrogen through oiling or pyrolysis processes. An integrated biorefinery could utilize a range of biomass inputs such as grains and lignocellulosic biomass to produce a number of useful products including food, animal feed, ethanol, chemicals, fuels and power by integrating the primary conversion routes into a single, highly efficient production facility.

**Citing the US Biomass Resource Assessment, or the “Billion Ton Study”, Dr. Adworth provided an assessment of the ability of biomass to meet USA transportation fuel demand.** The study estimates a potential biomass production of 1.3 billion tons per year from agricultural and forest resources. Compared to the 6.4 billion barrels of oil equivalent consumed by the US in 2003, this resource has the potential to provide 3.5 billion barrels of oil equivalent (heating value equivalent). With yields based on mid-term conversion technology, it is estimated that 1.9 billion barrels of oil equivalent could be provided through this large resource base.

On a commercialization continuum, bio-based fuels can be arranged from near-term to long-term as follows: ethanol, biodiesel, green diesel/gasoline, pyrolysis liquids, synthesis gas, algae, hydrocarbons (from hydrogenation of carbohydrates or lignin). Although advanced biochemical and thermochemical conversion technologies will not be available until 2012 or later to contribute to cellulosic biomass was once again highlighted. Even as the price has dropped by a factor of 20 in the last five years, the cost of enzymes remains a significant hurdle to the deployment of the necessary conversion technologies. Oils, fats and propanes can be used as feedstock for bio-renewable petroleum refinery; these refinery utilize existing process capacity, show a potential for lower conversion costs than FAME (fatty acid methyl ester, i.e. biodiesel) and result in a higher quality blending component. Fast pyrolysis and bio-oil can act as feed to power plant or petroleum refineries, while synthesis gas offers great flexibility through many feed and product options. The wide range of feedstock, production methods, and fuel products illustrates that multiple solutions should be pursued to yield significant production of bio-based fuels.

Justin Badek, the Co-Founder and Vice President for Research and Development at Blue Sun Biodeisel, LLC, provided a summary of a demonstration project called "Co-Producing Biofuels and Syngas for Transportation Fuel in a Self-Sustaining, Zero-Fossil-Fuel Integrated Bioenergy Using Non-Food Lignocellulosic Feedstock". Blue Sun Biodeisel is collaborating with the US DOE NREL, NRCS Blue Sun Development, LLC, Community Power and Corporation and Global Clean Energy on a $542 million, four-year project to demonstrate a self-sufficient, zero-fossil-fuels, fully integrated facility to validate the potential for rapidly deploying regional production capacity of 200 million gallons per year of biodiesel and synthetic diesel fuels.

Biodiesel and synthetic diesel have the potential to play a significant role in the US government’s goal of producing 35 million gallons of biofuels per year by 2017, which is approximately five times the current production level. The project aims to develop a non-food-based lignocellulosic feedstock–jatropha–which, according to Mr. Bzdek, has the potential to become a 100 million ton per year domestic crop, with a fossil energy ratio that could exceed 1:10 in commercial use. From a financial standpoint, the project aims to achieve production costs less than $1.50/gallon with positive cash flow in less than three years. No details on project timing were provided.

After hearing much enthusiasm for algae-based biofuels from previous panelists Dr. Doug Henston, the CEO of Blue Sun Biodeisel, was able to provide a unique perspective on the state of this technology, as his company is working to commercialize the technology for production of algae-based biofuels. Mr. Henston started his discussion by expressing the common theme that current feedstock and production methods are not sustainable and that sources “dislocated from food production” are needed. Algae utilizes less water, consumes more carbon dioxide per acre, has a superior energy balance and does not compete for arable land when compared to traditional feedstock, such as corn, soybeans, and sugar cane. Data was presented showing that algae has the potential to yield nearly 8,000-10,000 gallons per acre per year, compared to less than 500 gallons per acre per year from traditional feedstock.

With a focus on production cost metrics, Solts technology was touted as low-cost, scalable, and adaptive. The company model aims to position Solts as a technology and components supplier that will act as a partner in bio-crude production utilizing waste carbon dioxide from a range of industries (e.g. power producers, refiners, cement operations) to produce a spectrum of fuels and emission credits. Dr. Henston concluded by sharing his company’s near-term commercial development plan through 2008, which includes planning and deployment of Beta production facilities.

The final panelist, Dr. Mark Holtzapple, Professor, Department of Chemical Engineering at Texas A&M University, started his presentation with a brief perspective on current and future generation biofuels. He was yet another expert in the field who clearly explained that the biofuel of choice in the USA, corn ethanol, is not capable of scaling up to meet USA transportation fuel demand. Compared to corn grain, which yields 1.4 dry tons per acre per year, the “energy crops” sugar cane and energy crops can yield 20-25 and 30 dry tons per acre, respectively, illustrating that alternatives to corn grain should be pursued. In order to produce ethanol from these high-yield “energy crops,” technologies must be developed to break down lignocellulose into intermediates (i.e. sugars). With lignocellulosic ethanol requiring an input engine 100 times that of corn, it was argued that a lignocellulosic biofuels should look nothing like a corn biofuel.

Dr. Holtzapple went on to propose his Mix-Alco process as a potential solution. The Mix-Alco process, developed at Texas A&M University, takes biomass through a pretreatment and fermentation process resulting first in a carbohydrate salt (or salt of sugars). A dewatering process followed by chemical conversion results in mixed ketones. Finally, a hydrogenation process outputs the desired biofuel, alcohol. A financial analysis showed the Mix-Alco process to be 8-10 years away from being a competitive option with a production cost of US$0.50/gallon. Dr. Holtzapple calculates a return on investment of 90:1 per cent.

Each of these forward-thinking technologies and concepts show great promise in moving the biofuels industry toward more sustainable and higher-yielding next generation fuels.

Dr. Adworth’s overview of the US Biomass Resource Assessment illustrated the vast potential that biofuels have in the USA, corn ethanol. With continued advances in next generation biofuels technologies, the promise of this vast biomass potential could soon be realized.

**Feedstock and Infrastructure**

Even if technological advances in feedstock production, fuel conversion and use allow extensive implementation of biofuels, fuel distribution remains a significant obstacle to adoption. John Mahon, of Kinder Morgan, discussed this issue, proposing that the infrastructure problem might put a premature stranglehold on the industry. Kinder Morgan is the largest independent petroleum and chemical terminal operator in the USA and the nation’s largest Pipeline Master Limited Partnership (MLP) as Director of Business Development, Mr. Henston provides an overview of the current and future state of the biofuel market.

Houston’s Next Generation Biofuels – Trends in Global Innovation & Finance Conference drew a crowd of over 300 industry, science, academic, and policy leaders.

Mr. Mahon first presented data on the USA gasoline and distillate demand, showing the rapid rise in the last 10 years and how importantly, showing a continuing rapid rise projected over the next 10 years. The increasing demand coupled with data showing projected decreasing production from existing fossil fuel fields highlighted the need for biofuels. To transport these biofuels from places of production to places of consumption, a significant transportation infrastructure is necessary. Mr. Mahon assessed the existing infrastructure for transporting fuels, describing its shortcomings as an infrastructure for biofuels transportation. Biofuels are produced in the Midwest, but major markets are on the coasts. Current fuel infrastructure supports distributed imported fuel mainly from the coasts to coastal markets.

A major change will be necessary if we are to use biofuels generated in the Midwest. Mr. Mahon presented three maps showing existing pipelines, inland waterways and rail explaining the role each could take in moving biofuels from the Midwest to the coasts.
Existing pipelines mostly run along the US borders and therefore could not support Midwest to coast transport. The Mississippi River, the centerpiece of the US inland waterway system, has potential to move vast quantities of biofuels because it runs through the locus of ethanol and bio-refineries in the USA but does not reach coastal markets. The existing freight railroad network also shows promise for biofuels transportation as the network extends throughout the country. Mr. Mahon noted that this is likely the best option for transporting biofuels.

Mr. Mahon next discussed various transport costs. His current estimates for gasoline transport are 20 cents per gallon for a tank truck, 10 cents per gallon for rail transport, 5 cents per gallon for barges and 2 cents per gallon for pipeline transport. Pipeline is the preferred method, but he suggested that unit trains—100-car-long trains that travel without switching—will be the cheapest method of transporting ethanol from the Midwest to coastal markets. Terminals capable of unloading unit trains are expensive, and he suggested that building these types of terminals in every market would require strong demand for biofuels. Mr. Mahon then briefly discussed Kinder Morgan’s role in the current biodiesel market. As Kinder Morgan is testing biodiesel blends on its pipelines, the lack of biodiesel quality standards is a difficulty, indicating that there are other problems associated with transport than the existence of infrastructure.

Afternoon Keynote
Ian Waller, Managing Director of FiveBarGate Consultants, Ltd., delivered the afternoon keynote address. Mr. Waller works closely with the North of England Inward Investment Agency and has been instrumental in shaping the region’s biofuels industry. His overarching message encouraged those in the biofuels industry to count carbon; biofuels should be judged according to their entire life cycle carbon emissions.

A biofuel producer’s environmental credentials can be a powerful marketing opportunity or fodder for the anti-biofuel lobby. There is a strong political drive to reduce greenhouse gas emissions. Although biofuels are viewed as a means to achieve this end, produced improperly biofuels can have the opposite effect and lead to increased emissions. For this reason, greenhouse gas emissions from biofuels need to be quantified.

The current policy in the United Kingdom is to evaluate biofuels on environmental impacts, with an emphasis on carbon emissions. For this reason, greenhouse gas emissions from biofuels need to be quantified. The UK, the USA, and specifically Texas, have the opportunity to develop partnerships and co-manage 19 offerings worth US$6.7 billion. The firm’s clients range from small, privately held businesses to multinational corporations, government-sponsored enterprises and central banks worldwide. With an AA Credit Rating, RBS group has more than 36 million customers worldwide and total assets as of 30 June 2006 of US$1.7 billion.

www.rbs.com

Wood Mackenzie has been providing its unique range of consulting services and research products to the Energy and Life Sciences industries for over 30 years. With our foundation in quality analysis, our detailed industry understanding and our wealth of experience, Wood Mackenzie is able to offer clients a unique skill combination that sets us apart from other solution providers. Our market proposition is based on our ability to provide forward-looking commercial insight that enables our clients to make better business decisions.

www.woodmacresearch.com
Houston Technology Center (HTC), a non-profit 501(c)(3) corporation, is a business incubator dedicated to improving human and ecosystem well-being through the application of sustainability science and engineering. HTC’s current research programs include air quality and climate, next-generation energy technologies, biofuels, and ecosystem science and assessment. HTC employs a staff of about 45 researchers and administrators. Revenues are projected to reach US$20 million by 2008, primarily derived from projects supported by government agencies, foundations and corporations.

www.htcanet.org

BioHouston, Inc., a non-profit, tax-exempt [501(c)(3)] corporation founded by the Houston region’s academic/research institutions. We are leading a broad effort to establish the Houston region as a vigorous global competitor in life science and biotechnology commercialization. Our mission is to create an environment that will stimulate technology transfer and research commercialization, thereby generating economic wealth for the Houston region and making it a global competitor in life science commercialization.

www.biohouston.org

The Clean Energy Incubator (CEI) provides tomorrow’s Clean Energy innovators with the resources needed to compete in the real world. The incubator helps emerging companies leverage a rich network of industry experts and investors, fill knowledge gaps, build stronger business propositions and accelerate time to market. These factors improve venture success rates, which ultimately provide environmentally conscious energy alternatives for future generations.

www.cleanenergyincubator.org

Austin Energy is the nation’s 10th largest community-owned electric utility. We serve 360,000 customers and a population of more than 800,000. We provide service within the City of Austin, Travis County and a small portion of Williamson County.

As a publicly owned power company and a city department, Austin Energy returns profits to the community annually. That money helps fund City services such as fire, police, EMS, parks and libraries. We are committed to clean energy sources. That's just over 2,600 megawatts (MW) of total generation.

We created the top performing renewable energy program in the nation. We own the nation’s first and largest green building program. And, we’re home to one of the nation’s most comprehensive residential and commercial energy efficiency programs.

www.austinenergy.com

The British-American Business Council (BABC) Houston, was formed to educate, facilitate, encourage and promote trade and investment opportunities between South Texas and the UK.

As a founding member of the British American Business Council, BABC Houston is part of an international network consisting of 33 British-American associations and Chambers of Commerce. Our membership is comprised of leading local corporations, their senior executives, as well as small to medium business owners, all directly and indirectly involved in doing business between the USA and the UK. Our organisation participates in a variety of programmes, aimed to inform and educate on business networks, trends and opportunities, in addition to social and traditional cultural events.

www.babc.houston.org

The Houston Advanced Research Center (HARC) is a 501(c)(3) not-for-profit research organization based in The Woodlands, Texas dedicated to improving human and ecosystem well-being through the application of sustainability science and engineering. HARC’s current research programs include air quality and climate, next-generation energy technologies, biofuels, and ecosystem science and assessment. HARC employs a staff of about 45 researchers and administrators. Revenues are projected to reach US$20 million by 2008, primarily derived from projects supported by government agencies, foundations and corporations.

www.harc.edu

The mission of the Houston Renewable Energy Network (HREN) is to promote awareness of and education regarding renewable energy technologies and markets among energy professionals in the Greater Houston Metropolitan area. The HREN also serves as a networking ground for people with commercial and/or career interests in the renewable energy space. The HREN hosts quarterly speaking events which typically occur on Friday mornings and are open to the public. See the HREN website for past presentations and upcoming events.

www.houstonrenewables.org

The Houston Technology Center (HTC), a non-profit 501(c)(3) corporation, is a business accelerator and the largest technology business incubator in Texas, supported by more than 300 corporations and organizations, Houston’s leading academic institutions, Greater Houston Partnership, Texas Medical Center, NASA-Johnson Space Center, and the City of Houston.

Accelerating the commercialization of emerging technology companies by providing in-depth business guidance, access to capital and service providers, and entrepreneurial education, HTC has become the center of technology entrepreneurship, assisting more than 300 companies within several key sectors: Energy, Technology, Life Sciences, Nanotechnology, and NASA/Aerospace technologies.

HTC serves as the Gulf Coast Regional Center for the Texas Emerging Technology Fund, helping small to mid-size companies expedite the commercialization of new technologies.

www.houstontech.org

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The Jesse H. Jones Graduate School of Management at Rice University, one of the world’s best teaching and research universities, offers MBA, MBA for Executives, and MBA for Professionals degrees. The Financial Times 2007 survey ranked the Rice MBA program the best in Texas and consistently recognizes it among the top 10 business schools for finance, worldwide. The Jones School also offers joint MBA degrees in engineering and medicine, an undergraduate business minor, and a full schedule of executive education and customized courses for business and industry. The scenic campus is located in Houston, the nation’s fourth-largest city and a leading choice of Fortune 500 headquarters.

www.jonesgsm.rice.edu

NATIONAL RENEWABLE ENERGY LABORATORY

National Renewable Energy Laboratory (NREL) is the U.S. Department of Energy’s primary national laboratory for renewable energy and energy efficiency research and development. The Laboratory’s research capabilities range from fundamental science to technology applications. Research areas include solar, wind, biomass, hydrogen and fuel cells, advanced vehicle technologies and fuels and building technologies. The Laboratory also focuses on solving broader energy issues through work in fundamental energy science, cross-cutting energy analysis and transmission and distribution technologies. NREL is operated for the Energy Department by Midwest Research Institute and Battelle.

www.nrel.gov

THE NORTH OF ENGLAND INWARD INVESTMENT AGENCY

The North of England Inward Investment Agency (NoEIIA) is a regional development agency sponsored by the British Government that provides free and confidential services to North American companies seeking UK market entry. Operating from offices in Chicago, Los Angeles, Boston and Atlanta, the NoEIIA assists companies across a broad range of industries including emerging technologies such as bio-fuels and derivatives. The North of England is the New and Renewable Energy Center, which encompasses a range of lobbying, networking and financial services to bio-fuel companies. Also based in the region, is the North of England Inward Investment Agency, which provides assistance to companies in the North of England.

The North of England continues to be a global pioneer in the development of energy derived from bio-mass and other renewable energy sources. The region boasts a complete infrastructure to support its bio-fuel industry including oil refineries, storage plants and seed crushers. The North of England hosts cluster support for both existing and future investments and assists with supply chain and technology development, lobbying, networking and financial services to bio-fuel companies. Also based in the region, is the New and Renewable Energy Center, which encompasses a range of independent research, testing and development facilities bridging the gap between innovation and commercial realization.

www.northengland.com

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Located in Houston’s Galleria area at 5647 San Felipe, PKF Texas is a CPA firm that focuses on solutions for every stage of your business. With leaders who are forward-thinking entrepreneurs and business advisors with big four backgrounds, PKF Texas provides auditing, accounting, domestic/international tax compliance and planning, profit enhancement, litigation services, information technology and business systems consulting to emerging and middle market companies across many industries. PKF Texas is a member of PKF International and The Leading Edge Alliance. PKF International is an association of 217 legally independent accounting and consulting practices located in 120 countries. The Leading Edge Alliance is a group of major independently-owned accounting and consulting firms from around the globe that share an entrepreneurial spirit and a drive to be the premier provider of professional services in their chosen markets.

www.pkftexas.com

RICE ALLIANCE FOR TECHNOLOGY AND ENTREPRENEURSHIP

The Rice Alliance for Technology and Entrepreneurship (Rice Alliance) is Rice University’s flagship initiative devoted to the support of technology-entrepreneurship. The Rice Alliance is a collaboration among the Brown School of Engineering, the Jones Graduate School of Management, and the Wiess School of Natural Science.

Since its inception in late 1999, the Rice Alliance has assisted in the launch over 180 new technology companies, which have raised more than US$100 million in early stage funding. The mission of the Rice Alliance is to support the creation of technology-based companies and the commercialization of new technologies. The Rice Alliance provides entrepreneurs with a collaborative network and forum for support, education, and exchange of ideas. It often enters entrepreneurs access to the human and financial capital needed for success.

www.alliance.rice.edu

TEXAS BIOPRODUCTS COALITION

The Texas Bioproducts Coalition has been established as a not-for-profit entity to be a catalyst for the growth of a vibrant bioproducts industry across the State, taking a leadership position for the development and commercialization of bioproducts and related technologies across the global economy. Industry led, the coalition will drive economic development by promoting and facilitating collaboration in bioproducts research, technology commercialization, information exchange, and industry development.

www.bioproductstexas.com

TEXAS A&M UNIVERSITY’S ENGINEERING SCHOOL

Texas A&M University’s Engineering School, with 12 departments, more than 375 tenured/tenure-track faculty and about 9,500 students, is the university’s largest college and one of the largest engineering schools in the country. The college consistently ranks among the Top 10 public engineering schools by U.S. News & World Report in both undergraduate and graduate surveys, with biological and agricultural engineering, nuclear engineering, and petroleum engineering being ranked in the top three. Texas A&M Engineering ranks fourth in total research expenditures, with US$196.1 million, and seventh in total research expenditures per faculty member, with US$692,800.

www.engineering.tamu.edu
The University of Texas System has 15 campuses, including nine academic and six health science centers that today make up the System. These academic universities and health science centers have a combined enrollment exceeding 170,000 students, more than 80,000 employees, and an annual operating budget of US$7.8 billion. Since its beginning in the 1876 state constitution as a “university of the first class,” the University of Texas System has sought to meet the needs of the people of Texas through high-quality teaching, research, patient care, and public service. Throughout their history, the 15 academic universities and health science centers that today make up the System have embodied the passion and pride of Texas. Together, they have found their strength in the qualities of the people who comprise the U.T. family. Throughout the decades, the System has continued to push the boundaries of discovery and excellence. The System’s academic programs are recognized for their strength in a wide range of fields, from science and engineering to humanities and social sciences. The University of Texas System is proud to collaborate with the Greater Houston Partnership, the Houston Technology Center, and the Texas Higher Education Coordinating Board, as well as regulatory, commercial and legal aspects of such enterprises.

#### Supporting Organizations

**Texas Renewable Energy Industries Association (TREIA)**

The Texas Renewable Energy Industries Association (TREIA) is a non-profit trade association established in 1984. Its members are companies, organizations, and individuals involved in all of the renewable energy resources – solar, wind, biomass, geothermal and hydro. The membership includes (but is not limited to) dealers, distributors and installers of equipment, consultants, manufacturers, project development companies, power generators and marketers, design professionals, legal professionals, policymakers, program administrators, educators, and researchers.

TREIA promotes these industries to the broader public, lobbies for positive legislative and regulatory outcomes, encourages high business standards and ethics, and facilitates the sharing of information, business opportunities and technologies among its membership and beyond.

TREIA’s stated purpose is “To promote the common business interest and to improve the business conditions of persons in Texas engaged in renewable energy industries.” TREIA currently has over 300 members.

[www.treia.org](http://www.treia.org)

**The University of Houston’s Center for Industrial Partnerships**

The University of Houston’s Center for Industrial Partnerships aims at catalyzing early joint collaborations with industry and economic development organizations. Its goal is to increase companies’ competitiveness by fueling innovation while reducing commercialization risks. By fostering collaborative efforts using UH fundamental research and educational resources, the Center for Industrial Partnerships contributes to solving energy challenges for Houston and global businesses. The Center for Industrial Partnerships is home to the Texas BioProducts Industry Council and is proud to collaborate with the Greater Houston Partnership, the Houston Technology Center, and the Brazil-Texas Chamber of Commerce.

With a world-recognized faculty of scholars and industry executives combining leading-edge research and real-world experience, UH is preparing the energy industry workers of today while exploring critical issues affecting the energy industry’s future. The university-wide array of energy and energy-related research and scholarship includes: petroleum engineering; alternative and renewable energy sources such as wind and solar; superconductivity and fuel-cell technology; air quality and environmental projects; as well as regulatory, commercial and legal aspects of such enterprises.

[www.uh.edu/cip/](http://www.uh.edu/cip/)

**The University of Texas System**

The University of Texas System has 15 campuses, including nine academic and six health institutions, an enrollment exceeding 170,000 students, more than 80,000 employees, and an annual operating budget of US$7.8 billion. Since its beginning in the 1876 state constitution as a “university of the first class,” the University of Texas System has sought to meet the needs of the people of Texas through high-quality teaching, research, patient care, and public service. Throughout their history, the 15 academic universities and health science centers that today make up the System have found their strength in the qualities of the people who comprise the U.T. family: students, faculty, staff, alumni, supporters, and Regents. These thousands of individuals across the decades have embodied the passion and pride of Texas. Together, they have brought truly immeasurable benefits to Texas and the world.

[www.utsystem.edu](http://www.utsystem.edu)
SPEAKERS

MATTHEW BUTLER
Founder and President, Zenergy Bio Fuel, LLC

Mr. Butler, Founder and President of Zenergy Bio Fuel, LLC, entered into ag fuels was focused on biodiesel. He has experience in the full value chain of biofuels including: production facilities, biomass fueled power plants, biomass power plant technology, logistics modelling, economics, regulatory compliance, tax credits, incentives, working with the investment community, off-take agreements and feedstock. As a licensed and bonded diesel distributor and an IRS 617 registered ethanol and biodiesel blender Zenergy is local distributor. With the reality of the feedstock, logistics and market education needs, Zenergy Bio Fuel, LLC is now focused on education, logistics, trading, development of high yield crops, plantations, farming and R&D of biomass feedstock for all sectors of bio energy.

AMBISSADOR LINNET F. DEILY
Former Deputy, USTR, Former Member, Greater Houston Partnership Board of Directors

Ambassador Linnet Deily was nominated Deputy U.S. Trade Representative and Ambassador by President George W. Bush and confirmed in that post by the U.S. Senate in May, 2001. She served as the Chief of Mission of the United States Trade Representative (USTR) in Geneva and led the U.S. delegation to the World Trade Organization. She also helped launch the Delta Round of negotiations and led the U.S. delegation in Geneva in all aspects of the negotiations.

Prior to joining Schwab, Ms. Deily was chairman, president and CEO of First Interstate Bank of Texas with 123 branches throughout Texas and employing more than 3,000 people.

Born in Dallas and raised on a farm in McKinney, Texas, Ms. Deily received her Bachelor of Arts degree in Government from the University of Texas at Austin and Master of Arts degree in International Management from the University of Texas at Dallas.

JUSTIN BZEK
Co-Founder and Vice President, Research & Development, Blue Sun Biodiesel, LLC

Mr. Bzek’s research interests include broad aspects of biofuels and biorefining, with emphasis on biodiesel processing from first-generation and next-generation feedstocks, including canola and camelina oilseeds, algal and other microorganism feedstocks, and waste biomass feedstocks. Mr. Bzek is responsible for Blue Sun Biodiesel’s R&D division and intellectual property portfolio, and manages a team of staff and consulting researchers. His current research and development efforts focus on removal of polar contaminants from biodiesel and biodiesel blends, additive development, emissions and performance testing, algal extraction and processing technologies, glycerin and other biofuel production byproduct processing pathways, and integrated bioventing pathways with a variety of industries, government, national lab, and academic partners. He has authored numerous technical articles, essays, and other works, as well as two patent applications. Mr. Bzek is co-founder of Blue Sun and holds a B.S. in Chemistry from Colorado State University.

PAUL DICKERSON

Paul Dickerson, J.D., CPA, was appointed by President George W. Bush to serve as Chief Operating Officer of the Department of Energy’s Office of Energy Efficiency and Renewable Energy (EERE). In this capacity, Dickerson is responsible for day-to-day operational management and administration of the Office of the Assistant Secretary and for directing the implementation of the EERE priorities, policies, program development and execution, and strategic planning. With its US$1.47 billion budget, EERE invests in a diverse portfolio of energy technologies to provide efficient, clean and renewable energy leading toward a stronger economy, a cleaner environment, and greater energy independence for America.

Dickerson joins the Department of Energy having served as Chief of Staff for the United States and Foreign Commercial Service (Commercial Service) at the Department of Commerce where he was responsible for day-to-day management of the Commercial Service’s worldwide network of 1,700 employees in 260 offices, and for directing the implementation of the Commercial Service’s worldwide priorities and policies.

Prior to joining the Department of Commerce, Dickerson served as a corporate attorney in the Houston office of Haynes and Boone, LLP, assisting international and domestic clients with their global business transactions. Dickerson, a native of Houston, served the people of Texas and the nation on several state and federal boards, and he brings years of experience with trade policy development to this position.

Dickerson is a certified public accountant and a graduate of the South Texas College of Law. He received his Bachelor of Business Administration in Accounting from the University of Texas at Austin.

JAMES FAWLEY
Director of Strategy, BP, Global Biofuels

James Fawley leads the global strategy group for BP’s recently established Biofuels business. The business is intended to position BP as a leader in the biofuels industry: defining and implementing a business development strategy, establishing a distinctive and progressive voice in the shaping of the industry, investing in capability and capacity growth, and building strategic relationships. During his 12 years with BP, James has held a wide range of roles in the United States and Europe in Finance, Strategy and Business Development. He has also worked in several BP business units, including Petrochemicals, Commercial Fuels and now Biofuels. He holds an MBA in Finance from the University of Michigan and a Bachelor of Arts in Economics from the University of Chicago.

James lives in Chicago with his wife and two children.

DR. RAMON GONZALEZ
William W. Akers Assistant Professor, Department of Chemical and Biomolecular Engineering, Rice University

Ramon Gonzalez is the William W. Akers Assistant Professor in the Department of Chemical and Biomolecular Engineering at Rice University. He holds a Ph.D. in Chemical Engineering from the University of Chile, an M.Sc. from Catholic University of Valparaiso, Chile, and a B.Sc from Central University of Las Villas, Cuba and is also a licensed Professional Engineer.

Dr. Gonzalez’s research is predominantly in the field of biocatalysis and his long-term goal is the development of biological platforms for the production of chemicals and fuels from renewable sources. His research embroils three general areas: metabolic engineering, functional genomics fit systems biology, and microbial fermentations. Current projects include: (1) anaerobic fermentation of glycerol as a new platform for the production of biofuels and biochemicals; (2) understanding and harnessing the metabolism of 5 – and 6 – C-sugar mixtures obtained from plant biomass; (3) engineering nitrate and nitrite metabolic systems for the anaerobic synthesis of oxidized products; and (4) understanding the fermentative metabolism of pyruvate.
Edward Henston is Chief Executive Officer of Solix Biofuels, Inc. Previously, he was a strategic consultant in carbon mitigation strategies and renewable energies with Domani Sustainability Ltd., a biofuel start-up. At Agrol, he developed a novel high temperature ethanol process. Edward is the CEO of GBL. The company employs 25 people in newly developed lab space on Milton Park in Oxfordshire and is currently scaling up operations for demonstration projects.

PEARCE HAMMOND

Pearce Hammond is a Vice President of Institutional Research at Simmons & Company International. International in Houston. He joined Simmons in 2004 and covers the Alternative Energy and Coal sectors. Prior to Simmons, he worked for Duke Energy and Enron where his focus was on the power generation markets. Pearce has an MBA from Rice University and a B.S. from the United States Military Academy. He is also a member of the Houston Society of Financial Analysts and has been quoted in The Wall Street Journal and the New York Times.

DR. ROBERT HARRISS

Robert Harriss is President and CEO of the Houston Advanced Research Center. He also holds adjunct appointments as Professor, Dept. of Marine Sciences, Texas A&M University-Galveston and Professor, College of Architecture and Planning, University of Colorado, Boulder, CO. His current personal research interests include the design of disaster resistant and resilient communities; applications of information technologies, gaming, and new media to lifelong learning about disaster preparedness and recovery; and the design of technology pathways to a future bioeconomy.

BOB HARRIS

Bob received a B.S. in Ecology from Florida State University in 1962 and a Ph.D. in Geochemistry from Rice University in 1965.

DOUG HENSTON

Doug Henston is Chief Executive Officer of Solix Biofuels, Inc. Previously, he was a strategic consultant in carbon mitigation strategies and renewable energies with Diamion Sustainability Consulting and was President of Community Opportunities for Affordable Residential Communities (NYSC: AEC) in Denver, helping to grow the company from start-up to IPO in 2006. Prior to moving to Colorado, Doug worked at Goldman Sachs in the fixed income group. He served in the United States Navy from 1984 to 1992 as a Naval Aviator deploying twice to the Mediterranean. Doug sits on the Board of the Colorado Bioenergy Association and holds a B.S. with honors, in Molecular Biophysics and Biochemistry from Yale University and an MBA from the Harvard Business School.

KENNETH HERN

Kenneth T. Hern serves as Chairman of the Board and Chief Executive Officer of Nova Biosource Fuels, Inc. Mr. Hern served as President of Texaco Saudi, Inc. between 1981-84, as Vice Chairman and Managing Director of Texaco Nigeria Limited from 1984 through 1989, and as President of Texaco Brazil from 1989 through 1994. During his time with Texaco, Mr. Hern interacted with and advised government agencies of each country, and presided over significant relationship and liaison coordination between the United States and each nation. Mr. Hern still retains significant business and personal relationships in these nations and in particular in Brazil. Mr. Hern was nominated as United States Ambassador to Saudi Arabia and Nigeria. Mr. Hern provides critical guidance to the Company and international networking with large-scale business development experience. Mr. Hern earned a B.A. in Chemistry from Austin College, an M.S. in Organic Chemistry from North Texas State University, and Associates Degrees from the Wharton School of Business and from Carnegie Mellon University.

DR. MARK HOLTZAPPLE

Since 1986, Dr. Mark Holtzapple has been a professor of chemical engineering at Texas A&M University. In 1978, he obtained his BS chemical engineering degree from Cornell University and in 1981, he obtained his Ph.D. chemical engineering degree from the University of Pennsylvania. From 1981 to 1986, he served as an officer in the US Army and focused on developing a miniature air conditioning system to protect soldiers from heat stress while wearing chemical protective clothing.

In his role as a professor, Dr. Holtzapple has research interests in the following fields: conversion of biomass to fuels and industrial chemicals, advanced methods for processing human food and animal feed, and water desalination.

In his role as an entrepreneur, Dr. Holtzapple is President of StarRotor Corporation, which is dedicated to advancing the following energy-efficient technologies: engines, air conditioners, compressors, and expanders.

JONATHAN KIM

Jonathan J. Kim is a Senior Vice President in Power & Project Finance at The Royal Bank of Scotland (“RBS”) – New York Branch. Jonathan joined RBS in July 2006 as a Director in the Energy Structured Finance – Mid-Stream Group located in Houston, Texas. Prior to joining RBS, Jonathan held various positions in investment banking at major global banks in Houston and Los Angeles. In recent years, Jonathan has lead and completed several high-profiled and widely syndicated renewable energy financings including ethanol and wind-energy projects in the U.S. Jonathan is a Managing Editor, Environment, Energy & Finance, a leading publication on clean technology financings. He is also lead author of the annual Environment, Energy & Finance Industry Report (EEP) and has contributed to the reports of Asset finance mandates that cover various industries including alternative fuels, independent power, mining, telecommunications, and infrastructure, in North America, South America, Asia and Europe. Jonathan holds a BA in Political Science from the University of California at Irvine, and is a contributing author of “Private Investments Abroad – Problems and Solutions – Project Financing” 1997, Matthew Bendor.

PAUL LYNCH


Paul has also served in The Cabinet Office (1994–1996) as Private Secretary to the Parliamentary Secretary where he was responsible for The Public Services and Science & Technology Policy. At The Home Office (1991–1994), Paul worked on Prisoners’ Rights, the Police and Race Relations, and the Government response to the Royal Commission on Criminal Justice, including steering through the Criminal Justice Act 1994.

In 1988, Paul worked on the Mundubu JET programme with the Kasagwagi City Board of Education, in Saitama Prefecture, Japan. Paul received his BSc (Hons) in Psychology from Hatfield Polytechnic and a MSc in Social Psychology from the London School of Economics.
**SPEAKERS**

**JOHN MAHON**
Director, Business Development – Renewable Fuels, Kinder Morgan Terminals

John Mahon is currently the Director of Business Development for Renewable Fuels at Kinder Morgan Terminals where he has worked the past five years. John, a graduate of the United States Merchant Marine Academy, started his career in transportation as a ship’s officer on chemical tankers working for Maersk Lines and Stolt Tankers. When he finally came ashore with Stolt, he worked as the Operations Manager in their Latin and South American trade lanes. John later became an independent ship broker and then Chartership Manager for Seachem Tankers. John’s interest in the overall supply chain solutions later led him to the position of Business Manager for Optimum Logistics, a company that provided an internet-based platform offering supply chain solutions to the chemical industry. John then began his career with Kinder Morgan where he has found his 14 years of training have come together to work with multiple transportation entities as Kinder Morgan Director of Commercial Sales.

**CHRISS MAXWELL**
Bioenergy Specialist Advisor, One North East, The North of England Inward Investment Agency

Chris Maxwell is Bioenergy Specialist Advisor at the regional development agency for North East England, One North East. With a BSc in Geography from the University of Hull, England, Chris began his career with RWE npower as a Business Accounts Manager in 2001. After completing an MSc in Rural Development and Resource Management at the University of Newcastle, England, Chris moved to the Environmental Industries Federation as Biomass Coordinator, lobbying central government on behalf of the Industry in North East England.

In his current role, Chris is developing projects to support industry such as the £1.1m NEWHeat market stimulation initiative for the biomass heating market, and provides strategic input for the development of the agency's overall approach to energy and the North East Rural Development Programme for England.

**MATTHEW PARTRIDGE**
Senior Biofuels Consultant, Wood Mackenzie

Matthew is Senior Biofuels Consultant at Wood Mackenzie working on projects involving upstream oil and gas as a part of the Upstream Consulting team. He has over six years of experience in international energy markets, including asset valuation, crude oil and refined products market studies, and regional price-setting analysis.

Prior to joining Wood Mackenzie, Matthew worked for McKinsey & Co. as Senior Petroleum Analyst for North, Central, and South America. During his time at McKinsey & Co., Matthew was involved in several crude oil and refinery valuation projects. In addition, Matthew worked on several projects tasked with understanding price-setting mechanisms for crude and products pricing into various markets around the world.

Matthew holds a BA in English from the University of Houston and an MA in English from Stephen F. Austin State University. Matthew is also a graduate of the Defense Language Institute in Monterey, CA, where he studied the Vietnamese language.

**ARISTIDES A.N. PATRINOS, PH.D.**
President, Synthetic Genomics, Inc.

Aristides A.N. Patrinos, Ph.D., is president of Synthetic Genomics, Inc., a privately held company founded in 2005 dedicated to developing and commercializing synthetic genomic processes and naturally occurring processes for clean, renewable alternative energy solutions that mitigate global climate change.

Dr. Patrinos was instrumental in advancing the scientific and policy framework underpinning key governmental energy and environmental initiatives while serving as associate director of the Office of Biological and Environmental Research in the U.S. Department of Energy’s Office of Science. He oversees the department’s research activities in human and microbial genome research, structural biology, nuclear medicine and climate change.

Dr. Patrinos played a historic role in the Human Genome Project, the founding of the DOE Joint Genome Institute and the design and launch of the DOE’s Genomes to Life Program, a research program dedicated to developing technologies to use microbes for innovative solutions to energy and environmental challenges.

Dr. Patrinos is a fellow of the American Association for the Advancement of Science and of the American Meteorological Society, and a member of the American Geophysical Union, the American Society of Mechanical Engineers and the Greek Technical Society. He is the recipient of numerous awards and honorary degrees, including three Presidential Rank Awards and two Secretary of Energy Gold Medals, as well as an honorary doctorate from the National Technical University of Athens. A native of Greece, Dr. Patrinos received his undergraduate degree from the National Technical University of Athens, and a Ph.D. in mechanical engineering and astronautical sciences from Northwestern University.

**RICARDO RODRIGUEZ**
CEO, Bioverda US Holding, Virgin Bioverda

Mr. Rodriguez joined Bioverda US Holdings LLC June 2007. He has a diverse background including extensive experience in Oil & Gas, Infrastructure Projects, Venture Capital/Private Equity, Mergers & Acquisitions, and Management Consulting. He currently serves on the board of several companies.

Mr. Rodriguez joined Bioverda US Holdings LLC to develop, own and operate a portfolio of sustainable, state-of-the-art, biofuel and bioenergy projects in the United States and the Americas. Biofuel projects include bioethanol and biodiesel. Bioenergy projects include landfill gas, biogas, and biomass projects.

Bioverda US Holdings LLC (Bioverda), located in Chicago, is a wholly owned subsidiary of Bioverda Ltd which is in itself a wholly owned subsidiary of NTR, a leading Irish registered company specializing in the development and operation of renewable energy projects and sustainable waste management.

Mr. Rodriguez co-authored Offshore Civil Engineering, published SPE papers and participated in key E&P forums around the world over the last five years.

Mr. Rodriguez holds an MBA from the University of Chicago and BS Mining Engineering from Colorado School of Mines.
**SPEAKERS**

**MATT SIMMONS**
Chairman, Simmons & Company International

Matthew R. Simmons is Chairman of Simmons & Company International, a specialized energy investment banking firm. Covering all aspects of the global energy industry, the firm has offices in Houston, Texas; London, England; Boston, Massachusetts and Aberdeen, Scotland.

Mr. Simmons serves on the Board of Directors of Brown-Forman Corporation, The Initiative for a Competitive Inner City (Boston), Houston Technology Center and the Center for Houston’s Future. He also serves on The University of Texas’ M.D. Anderson Cancer Center Foundation Board of Visitors and is a Trustee of the Bermuda Biological Station for Research. In addition, he is past Chairman of the National Ocean Industry Association, serves on the Board of Dean’s Advisors of Harvard Business School and is a past President of the Harvard Business School Alumni Association. He is a member of the National Petroleum Council, Council on Foreign Relations and The Atlantic Council of the United States. Mr. Simmons is a Trustee of both The Farnsworth Art Museum and the National Trust for Historic Preservation.

Mr. Simmons graduated cum laude from the University of Utah and received an MBA with Distinction from Harvard Business School. His recently published book Twilight in the Desert: The Coming Saudi Oil Shock and the World Economy has been listed on the Wall Street Journal’s best-seller list.

**BILL SWANSTROM**
Partner, Locke Lord Bissell & Liddell LLP

Bill Swanstrom is co-head of Locke Liddell’s Energy Practice group. He has nearly twenty years’ of experience working with energy companies in their significant acquisition and divestiture activities. He is a regular speaker and writes on energy M&A issues. Mr. Swanstrom also has substantial experience in energy private equity transactions, representing both investors and companies. In addition, Mr. Swanstrom has significant experience in project development and financing of energy assets, including the development of the largest gas pipeline developed in the U.S. in the last twenty years, and the largest wind farm in the world. Mr. Swanstrom holds a JD from the University of Texas Law School and a BA in economics and English from Southern Methodist University.

**IAN WALLER**
Managing Director, FiveBarGate Consultants Ltd.

Ian is an engineer by background, and retains an active interest in technology developments within biofuels. He is a fellow of the Royal Chartered Institution of Engineering and Technology. Ian has fifteen years of experience within various energy sectors, including nuclear power plant, crude oil refining, and fossil fuel power generation, heating and cooking as well as road transport. Since the early years’ of this millennium, Ian has been working on renewable transport fuels, and lead the development of the first successful high volume branded biofuel sales in the United Kingdom, from within a refining business. This has lead to a growing interest in renewable fuels, which resulted in Ian establishing his own advisory business in biofuels, providing technical, commercial, legislative and strategic direction to a number of private and some public sector clients in Europe and around the World. Ian sits on the UK Government advisory panel on the developing biofuel Carbon reporting standards. Ian is married with two young sons and lives in the North East of England.

**DAN WATKINS**
Managing Director, DFJ Mercury Venture Partners

Dan is a Managing Director of DFJ Mercury Venture Partners and sits on the boards of Vertos, DNAForm, VizionWare, Blumex and Glyco Biotechnology, Inc. His specialty areas are in cleantech and life sciences. Prior to DFJ Mercury, Dan was the founder and Managing Partner of A3 Associates, L.P., a Houston-based investment firm focused on seed-stage investments and advisory services for start-up companies. In this capacity, Dan served as President and founding investor of Advanced Reality, co-founder of Nanospectra Biosciences, founding investor of X-MRI, and CEO of DNAForm. Prior to that Dan worked as an investment banker and as a senior manager for Scientific Software International.

Dan received his BS in Materials Science and Engineering from Rice University and his MS and PhD in Materials Science and Engineering from Carnegie Mellon University.

**ROB YORK**
Executive Vice President, Marketing and Supply, BioSelect

Mr. York has over thirty years of experience in the food and edible oils businesses. Prior to joining BioSelect, Mr. York was the executive vice president of strategic commodity sourcing for the Humko Oil Products business unit of ACH Food Companies. York began his career with Central Soya, a leading U.S. soybean processing company. He joined Kraft Foods in 1986 as a commodity trader responsible for all oil procurement activities for Kraft and its refinery operations. In 1995, Kraft sold its edible oils business to Associated British Foods of London, leading to the formation of ACH Food Companies. Rob was the director of marketing for the company’s retail products group prior to being named executive vice president in 1999. Mr. York is a member of the board of directors for QUALISOY.

Mr. York holds a bachelor’s degree in business administration from the University of Memphis and a master’s degree in business administration from St. Francis University.
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