THE NEW ENERGY DYNAMICS: IMPLICATIONS FOR AGRICULTURE, FOOD, BIOFUELS AND TRANSPORTATION

A Multi-Client Study

May 2012

Introduction

Over the last few years, as the US and world economies have recovered in fits and starts from the 2008 recession, the prices of different forms of energy have taken divergent paths. Most dramatically, crude oil prices have recovered sharply from their lows at the depth of the financial crisis, while US natural gas prices have fallen further. US natural gas prices have become delinked from crude oil prices and now trade at a sizable discount to crude oil when measured on an energy-equivalent basis. This has significant implications to users of gasoline, diesel and natural gas, including those in the agriculture, food, biofuels and transportation industries.

![WTI Crude and Henry Hub Natural Gas Prices per Million Btu](image)

Note: 1 barrel of crude contains 5.8 million Btu
Despite rising production, the US still imports almost half of the petroleum that it uses. Accordingly, US prices of crude oil remain inextricably linked to world market conditions, and, as a result, US prices are subject to volatility connected to both market and geopolitical risks.

On the other hand, there is not a tight price arbitrage in world markets for natural gas, because it is difficult and expensive to transport natural gas over long international routes, particularly those requiring multimodal shipments. In the US, the development and adoption of new technology – specifically hydraulic fracturing (or “fracking”) and horizontal drilling – has enabled vast quantities of shale gas reserves to be accessed economically. As a result, dry shale gas production in the US increased from 1.0 trillion cubic feet in 2006 to 4.8 trillion cubic feet in 2010, and it is preliminarily estimated that production reached 7.2 trillion cubic feet in 2011; meanwhile, total dry natural gas production rose to 23.0 trillion cubic feet in 2011 from 16.1 trillion cubic feet in 1986, up 43% in a quarter century.

This situation raises several interrelated questions. First of all, can the current price spread between crude oil and natural gas be sustained over the medium-to-long term? If so, how will US-based companies adjust their operations to this new reality, and how will it affect their competitiveness and profitability? More specifically, how will all of this impact the agriculture, food, biofuels and transportation industries?

**Preliminary Study Outline**

**The New Energy Dynamics:**
**Implications for Agriculture, Food, Biofuels and Transportation**

I. **Background**
   - This section will describe the need for the study and introduce developments in the business environment.
     » Why the study / why now?
     » Brief review of developments now occurring in the unconventional natural gas sector
     » Other developments in the business environment

II. **Unconventional Natural Gas Sector Profile**
   - What is unconventional natural gas?
     » Types of natural gas
     » Unconventional natural gas reserves (size, location, etc.)
       ▪ US
       ▪ World
     » Uses of unconventional natural gas
   - Development of unconventional natural gas resources
     » Technology
     » Competitiveness of unconventional natural gas versus other energy sources
     » Drilling and production activity
» Leading developers/producers

• Regulatory considerations
  » Concerns about unconventional gas development
    ▪ Drinking water contamination
    ▪ Fracking fluid composition and by-product water contamination
    ▪ Safety
    ▪ Other human health and environmental concerns
  » Regulations and potential actions by government agencies
    ▪ EPA and other federal agencies
    ▪ States and municipalities
  » Climate change
    ▪ Brief overview of climate change considerations for natural gas
    ▪ Natural gas considerations associated with the use of carbon credits internationally

• Distribution/delivery considerations

III. Long-Term (10-Year) Outlook for Crude Oil, Gasoline, Diesel and Natural Gas Prices

• Balance sheets for crude oil, gasoline, diesel and natural gas
  » Domestic production and imports
  » Domestic use by sector and exports

• Price forecasts
  » Baseline forecast
  » Alternative scenarios
    ▪ Qualitative scenario reflecting effect of potential regulatory actions due to environmental, human health or safety concerns
    ▪ Assessment of the likelihood of a scenario in which large-scale increases in North American crude oil production could erode the price advantage of natural gas

IV. Natural Gas Vehicles (NGVs) and Compressed Natural Gas (CNG)

• Characteristics of NGVs
• Current NGV fleet
• Policy considerations, including incentives and fuel taxes
• Factors to consider in determining whether to convert vehicles to CNG
• Economics of NGVs
  » Tractor-trailer rigs
  » Public transportation
• Infrastructure and other constraints to be overcome
• Conclusion regarding potential for displacing other liquid fuels in both the short term and long term

V. Implications for Agriculture, Food, Biofuels and Transportation

• Will inexpensive natural gas lead to a resurgence in manufacturing?
  » Fertilizer manufacturing
The New Energy Dynamics: Implications for Agriculture, Food, Biofuels and Transportation

- Overview of US vs. global production
- Potential new cost advantages of US production
- Potential future trajectory of US fertilizer production
  » Bulk commodity processing
    - Grains and oilseeds
    - Biofuels
    - Meat and poultry
  » Food processing
- Will natural gas-powered engines lead to significant changes in the logistics and handling of agricultural commodities?
  » Impacts by mode of transportation
    - Trucking
    - Rail
    - Other
- Will the divergence between expensive crude oil and inexpensive natural gas last and enhance the competitiveness of biofuels producers?
- Broader implications for agriculture, food, biofuels and transportation (qualitative conclusions)
  » Agricultural commodity production costs and competitiveness
  » Retail prices of food and fuel
  » Broader impacts on the transportation system
  » Other implications

VI. Implications for Other Industrial Sectors
- Will inexpensive natural gas lead to a resurgence in non-agriculture-related manufacturing?
- What will be the implications for utilities?
  » Competition between natural gas and coal
    - Implications for US coal usage and exports
- What will be the implications for the broader economy?

VII. Summary and Conclusions

Methodology

The study’s methodology will entail a unique blend of “desk research” and industry contact/content derived by a uniquely talented study team. The study team’s broad-scale databases, ability to establish new data series for new markets combined with proven economic and business analysis skills will underpin the breadth, depth and substance of this important study.
Who Should Subscribe to This Study?

Every segment of the energy, agriculture, food and biofuels industries:
- Food processors
- Food distributors and retailers
- Foodservice operators
- Crop, livestock and poultry producers
- Fertilizer and agricultural chemicals producers
- Grain storage, handling and transportation companies
- Biofuels producers
- Natural gas producers, pipeline operators, and marketers
- Liquid fuel producers, distributors and retailers
- Policy makers and regulatory agencies
- Equity investment firms and hedge funds
- Lenders and other financial services providers

Study Deliverables

The project will involve several specific deliverables for participating clients including:

- **Pre-Study Conference Call.** An Internet-based meeting and conference call of participating clients and Informa study staff will be held to review the detailed plans for the study and to *identify particular areas and issues that clients want special attention given to*. This conference call will address the major study topics and enable specific client comments and interests relating to each to be noted.

- **Comprehensive Study Report and Presentation Materials.** All participating clients will receive “*The New Energy Dynamics: Implications for Agriculture, Food, Biofuels and Transportation,*” the fully documented study report containing all analyses, projections and supporting detail developed during the study. Clients also will receive copies of all PowerPoint presentation materials used in reporting study results. (All materials will be provided electronically.)

- **Post-Study Seminar.** A concluding, daylong seminar will be held for all clients as a group to participate with study staff in fully reviewing the findings and implications. (Depending on client interest, this seminar may be conducted over the Internet).

- **Final Report Presentation at Clients’ Offices.** Informa staff will travel to client offices to present the final report and conduct in-house seminars, as requested. These seminars will be tailored to each client’s individual needs and interests. Informa staff will present these findings at the clients’ offices for only out-of-pocket expenses.
Study Team

Scott Richman, Senior Vice President in Informa's management consulting group, will coordinate the overall project. Other Informa staff with directly relevant experience will actively participate in conducting the study, including Dr. Bruce Scherr, Tom Scott, Ken Eriksen, Juan Sacoto, Karen McCary, Kip Butts, Scott Sigman and Sijesh Aravindakshan. Bill Martin, chairman of the international energy consultancy Washington Policy & Analysis ("WPA"), which is a “sister company” to Informa Economics, will serve as an advisor on the study.

Bruce A. Scherr, Chairman of the Board and Chief Executive Officer. Dr. Scherr has been with Informa Economics, Inc. (formerly Sparks Companies, Inc.) since 1987 in several executive capacities including President and CEO. In addition, he is an Advisor for Metalmark Capital LLC, a private equity fund. Formerly he was president of Sparks, Jacobs, Scherr, Inc. (SJS), a sister company to Sparks, and president of Agri-Commodities, Inc., an agriculture consulting firm based in Andover, Massachusetts, which was acquired by SJS. Prior to forming Agri-Commodities, Dr. Scherr was a divisional vice president at Data Resources, Inc., where he developed and utilized for the public and private sectors the first commercially available econometric model for US agriculture. Dr. Scherr received his bachelor's degree from Rutgers University and his master's and doctorate degrees from Purdue University, all in agricultural economics. Currently, he is a member of the Board of Trustees of the North American Electric Reliability Corporation, E. Ritter & Company, and he serves as a member of the Global Strategy Institute Advisory Council of the Center for Strategic and International Studies. He served as a member of the Board of Directors for Desert STAR Inc., an electrical transmission Independent System Operator for the Desert Southwest from January 2000 through February 2002. In addition, Dr. Scherr has served as a member of The University of Tennessee’s (UT) Institute of Agriculture Agricultural Development Board and UT’s Committee for the Future. He was named a 2007 Distinguished Agriculture Alumni from Purdue University and he is a member of several honorary research and agricultural societies, a member of the National FFA Foundation Sponsors’ Board 2000 through 2001 and a former advisor to the President's Council of Economic Advisers and National Aeronautics and Space Administration.

Thomas P. Scott, President and Chief Operating Officer. Mr. Scott has been with Informa since 1989 with the majority of that time being the head of the Informa Economics Project Consulting Group. Mr. Scott's specialized work has included business strategy, agribusiness economic development, feasibility and site selection work, as well as various market analyses. In addition to his work in North America, Mr. Scott has extensive experience in the agribusiness sectors of Central Europe, Southeast Asia and South America. He has been involved in many training programs developed and delivered by Informa Economics. Prior to joining the company, he had various assignments in management, trading, logistics and merchandising with Continental Grain Company. He received his bachelor's degree in agricultural economics and business from Cornell University and a master's degree in business administration from the Amos Tuck School of Business Administration at Dartmouth College where he was an Amos Tuck Scholar.

Ken A. Eriksen, Senior Vice President. Since 2011, Mr. Eriksen has been the leader of Informa Economics' Transportation, Industrials and Energy Services Group. In this capacity, he directs the group's efforts in client service, research, risk management, consulting and events. Since joining Informa in 2001, Mr. Eriksen has led Informa's transportation services and co-led Informa's project consulting practice. Mr. Eriksen regularly speaks on transportation and infrastructure issues and developments, and is an expert witness in the area of transportation, logistics and supply-chain matters. Prior to joining the company, Mr. Eriksen worked for the USDA’s National Agricultural
Statistics Service as an agricultural statistician. In that capacity, he conducted national surveys and set national estimates in agriculture. Also while at USDA, he worked for the Agricultural Marketing Service on its transportation and marketing program, conducting research and analysis on domestic and international transportation issues. He also worked as an international longshoreman for the Pacific Maritime Association in Tacoma, Washington. He received his bachelor’s and master’s degrees in agribusiness and agricultural economics from Washington State University. While working on his master’s degree there, Mr. Eriksen was a transportation economist for the Department of Agricultural Economics, performing economic transportation data analysis and modeling.

**Juan E. Sacoto, Senior Vice President.** With Informa Economics since 1997, Mr. Sacoto is the leader of Informa's Project Consulting Group with his primary responsibility including research and analyses for international and domestic consulting clients. His work often involves market assessment, financial and competitive analyses, economic modeling, business strategy, international economic development, economic impact, risk management, and acquisition/investment due-diligence studies. Mr. Sacoto has extensive knowledge and experience analyzing most agricultural, food and related markets, including grains and oilseeds, feed ingredients, livestock and meat, vegetable oils, fisheries, fertilizers, fruits and vegetables, grain storage, and farm equipment as well as the renewable fuels industry, particularly biodiesel. He also has extensive practical experience evaluating agribusiness and renewable fuel projects across several regions, including Latin America, Europe and Africa. He is fluent in Spanish and has broad cross-cultural training. Prior to joining the company, he worked as a financial and equity analyst. He received his bachelor's degree in finance from Jacksonville State University and his master's in international business administration from The University of Memphis.

**Scott A. Richman, Senior Vice President, Consulting.** With Informa Economics since 1991, Mr. Richman provides consulting services primarily to Informa's commercial consulting. Among Mr. Richman's responsibilities, he has led numerous consulting assignments regarding ethanol and agricultural biotechnology. Mr. Richman has extensive experience conducting financial feasibility studies, preparing business plans, directing economic impact studies, constructing market forecasts and advising companies on the positioning of products within specialized markets. Along with work throughout the United States and Canada, he has participated in consulting projects in Western Europe and Poland. In addition to his experience at Informa, Mr. Richman spent one year at Hart Energy as Executive Director, Global Biofuels and Agriculture, where he was responsible for directing multiclient studies on the North American and Brazilian ethanol industries and markets and was a primary contributor to the North American Biofuels Database. Mr. Richman received his bachelor's degree in economics from Vanderbilt University and his master's degree in international affairs at Columbia University, where he specialized in international business and was an Honorary International Fellow.

**H. W. "Kip" Butts, Director of Energy Services and Senior Analyst, Cotton.** As a member of the Informa Economics' Transportation, Industrials and Energy Services Group, Mr. Butts directs the energy group’s analyses and develops customized trading strategies for all of the energy products as well as leads the energy group’s sales efforts. Concurrent with his energy analyses, Mr. Butts is responsible for the Informa Economics fundamental research of cotton cash and futures markets with emphasis on hedging and trading strategies. Mr. Butts helped establish and was the inaugural manager of Informa Economics' Producer Services, a farm-level consulting business devoted to assisting farmers in marketing their crops through the development of customized farm price risk management programs. Prior to joining the company, Mr. Butts was a corporate economist for Cargill subsidiary Hohenberg Bros. Co., now Cargill Cotton, in Memphis, Tennessee, where he provided economic analyses, interpreted and analyzed farm program legislation, conducted
fundamental analyses of domestic and world cotton markets, and was a critical member of the company's risk management team. Mr. Butts received his bachelor's degree in economics and international relations from The University of Memphis.

**Karen M. McCary, Director of Communications, Energy Analyst.** Ms. McCary’s primary responsibilities include coordination and publication of the Informa Economics reports. This includes being the primary writer and research analyst for the company's Energy Comments publication and contributing to and overseeing the Informa Economics daily Morning Comments publication. As a key member of the company's Transportation, Industrials and Energy Services Group, Ms. McCary has integral knowledge about all of the energy (natural gas, petroleum and renewable) futures and cash markets. In addition to editing the company's other publications, Ms. McCary also is responsible for coordinating and coverage of grain and livestock government policy information, as well as working with the press in disseminating the Informa Economics press releases and other company promotional information. Prior to joining the company, she was an associate editor of marketing for Farm Journal and marketing editor for Top Producer (a Farm Journal, Inc., sister publication). Ms. McCary also was the editor of several agricultural trade publications for Watt Publishing Co. and headed the communications for a large agricultural co-op in Indiana. She received her bachelor's degree in agricultural economics and agricultural communications from The Ohio State University.

**Scott J. Sigman, Senior Consultant.** Mr. Sigman has over 25 years of experience in global trade and transportation planning, assessment of economic impacts, preparation of reports, business plans, assessments and studies focused on container intermodal as well as multimodal freight operations. He has intertwined public and private enterprise business development experiences with a range of operational experiences in transportation including hazardous materials management, as well as port homeland security cargo planning. Sigman has worked with a global container shipping company in sales, trade management and marketing; worked with the largest global special container fleet in managing utilization and logistics for assets held by the company; and worked for the state port authority in Indiana in public planning and business development. He also has experience in budgeting, marketing, proposal writing as well as overseeing responses to requests for proposals (RFPs) through application of professional project management methodologies. Freight handling, including agricultural commodities and economic development experiences with infrastructure finance, consulting and environmental planning exercises have included engaging community stakeholders for major projects. Deep water maritime and inland waterways and Great Lakes–St. Lawrence Seaway market development have involved transport economics, costing and routing assessments. Working within the contexts of inspection procedures and applied regulatory compliance initiatives in which he has been involved have included foreign trade zone documentation procedures, while aligning transport asset and infrastructure financing experiences at federal, state and local levels. Mr. Sigman has applied analysis in consultative evaluations of transport modal shift, supply chain logistics, collaborations with engineering and construction management for transport facility development, and been integral to staffing logistics operations. He received his bachelor’s degree, with a double major in economics and international relations from the University of Wisconsin-Madison. He earned his master’s degree in economics, focused through the Sea Use Law, Economics and Policy Programme from the University of London-London School of Economics and Political Science in London, England.

**Sijesh C. Aravindakshan, Energy Analyst.** Dr. Aravind’s responsibilities include fundamental analysis of the energy markets, price forecasting, and supporting consulting projects in the areas of petroleum and renewable energy. Before joining Informa Economics, he worked as a research assistant professor at North Dakota State University (NDSU) at the Center for Agricultural Policy and Trade Studies. At NDSU, he conducted research in the area of renewable energy production and
taught macroeconomics for undergraduate students. Dr. Aravind was a research assistant at Oklahoma State University and has extensive research experience in renewable energy production and quantitative finance. He has been published in international peer reviewed journals and made presentations at academic conferences in the area of renewable energy. He also worked as an agricultural officer for the government of Kerala, India. Dr. Aravind received his master’s degree in agribusiness and applied economics from North Dakota State University and a doctorate in agricultural economics, with a minor in quantitative finance, from Oklahoma State University.

William F. Martin, Chairman, Washington Policy & Analysis. Mr. Martin is a Wharton and MIT educated energy economist who served as the Executive Secretary of the National Security Council, Special Assistant to the President and Deputy Secretary of the US Department of Energy under President Reagan. He is currently the chairman of the DC based international energy consultancy Washington Policy & Analysis (“WPA”), chairman of the Department of Energy’s Nuclear Energy Advisory Committee and chairman of the Council on Foreign Relations’ Energy Security Group, where he co-authored the Trilateral Commission Report, “Maintaining Energy Security in a Global Context.” Before moving to the National Security Council, he was responsible for energy statistics for developing countries at the International Energy Agency (IEA, OECD, Paris) as well as being a Program Officer in the MIT Energy Laboratory for four years. In his current role of chairman of WPA, he has directed and produced numerous energy statistical reports on topics such as the future of oil and natural gas supply and demand in the US utilizing the WPA Global Energy Model, which is a flexible forecasting tool that adds an important quantitative dimension to Washington Policy & Analysis’ products by producing forecasts at several levels of aggregation. The strength of this model lies in its forecasting ability, which allows business planners to establish reliable patterns of energy supply and demand, from which non-energy planning estimates can be made.

**Study Schedule**

- June 2012: Kick-off; pre-study conference and study begins
- October 2012: Study completed – final report sent to clients
- October 2012: Group presentation of study findings (Memphis) and start of individual presentations at client offices

**Study Fees**

The fees for participating in the study are $7,500 for Informa Economics clients and $9,500 for non-clients. The fees include the pre-study conference, the subscriber group review seminar, and a presentation at client's offices by Informa Economics’ staff (as requested). Cost of company representatives’ travel to the conference and seminar, and expenses for Informa Economics’ staff to travel to companies’ offices for the presentation are not included.

**About the Informa Economics Group**

Informa Economics, Inc. (formerly known as Sparks Companies, Inc.) is a world leader in broad-based domestic and international agricultural and commodity/product market research, analysis, evaluation and consulting. The company was founded in 1977 and, in 2003, was acquired by Informa plc ("Informa"). Informa Economics, Inc. serves hundreds of firms, institutions and trade organizations worldwide from our headquarters in Memphis, Tennessee. Offices that are a
part of the Informa Economics Group (“IEG”) include Informa Economics-FNP Brazil in Sao Paulo, CEAS in London and Brussels and Washington Policy & Analysis in Washington, DC.

Our Mission: "To be a Vital Force in the Success of Agriculture, Food, Energy and Transportation Interests Around the World."

The company's professional depth and experience allow us to provide a wide range of services related to the economic and management concerns of clients. Underpinning these services, our principal strengths lie in an expansive information base and a professional and experienced staff.

In its role as a world leader in comprehensive commodity, food industry and agribusiness research and consulting, Informa Economics offers several broad categories of services:

- Research/Analysis/Evaluation
- Business Consulting
- Education/Training
- News/Communication
- Energy

Washington Policy & Analysis, which is part of the Informa Economics Group, is an international consulting firm specializing in energy, environment, trade, transportation, technology, and maritime security and intelligence issues. The firm provides strategic business intelligence, analysis, and advisory services to companies, trade associations, and governments worldwide. Washington Policy & Analysis has an accomplished staff of economists, lawyers, policy analysts and international trade specialists. The firm produces seminars and studies and uses WPA Global Energy, its global modeling system, to examine broad trends in national, regional, and global energy markets.

The Informa Economics Group is a division of Informa plc (“Informa”), the leading international provider of specialized information and services for the academic and scientific, professional and commercial business communities. Informa has over 150 offices in more than 43 countries and employs 8,500 staff around the world.

Informa is the largest publicly-owned organizer of conferences and courses in the world with an output of over 8,500 events annually. Informa publishes over 2,500 subscription-based information services including academic journals, real-time news and structured databases of commercial intelligence. Informa’s book business has more than 50,000 academic and business titles in print.

Informa's products are founded on high-value content in a wide variety of subject areas. These range from the arts and humanities through social sciences to physical science and technology; from the professional domains of finance and the law to commercial fields such as telecommunications, maritime trade, energy, commodities, and agriculture.
ENROLLMENT FORM

☐ Yes, I want to participate in the special multi-client study, entitled “The New Energy Dynamics: Implications for Agriculture, Food, Biofuels and Transportation.” The cost of the study for current Informa Economics’ clients is $7,500 and $9,500 for non-clients. One half will be billed upon initiation of the study and the remaining one half upon my receipt of the final written report.

Return Form to Informa Economics, Inc.
Via Fax to (901) 766-4471

☐ Please have someone contact me to provide further information.

Name: ___________________________________ Signature: ____________________________

Title: ________________________________________________

Company: ________________________________________________

Street Address: __________________________________________

City, State, ZIP: __________________________________________

Telephone: ___________________________ Fax: ___________________________

E-mail Address: ____________________________________________

Please feel free to contact us with questions:

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