
MUSINGS FROM THE OIL PATCH

November 23, 2010

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Note: *Musings from the Oil Patch* reflects an eclectic collection of stories and analyses dealing with issues and developments within the energy industry that I feel have potentially significant implications for executives operating and planning for the future. The newsletter is published every two weeks, but periodically events and travel may alter that schedule. As always, I welcome your comments and observations. Allen Brooks

Separating Wheat From The Chaff Of Unconventionals

Increasingly, petroleum industry executives are speaking out about the significance of the unconventional hydrocarbon resources in this country, although they do not always agree about the longer term outlook for the resources. In some cases we question the extrapolations speakers are making about the importance of unconventional resources in the nation's long-range energy mix and, for that matter, the world's mix.

Horizontal drilling and hydraulic fracturing technologies have dramatically altered the near-term supply picture and have forced energy prognosticators to recast their forecasting models

Recently, several senior energy executives spoke at industry meetings about their views of these trends. One presentation that received media attention was by Mark Papa, CEO of EOG Resources, Inc. (EOG-NYSE). His presentation was to a joint meeting of the Houston chapters of the IPAA and TIPRO. With respect to the success of unconventional drilling and production, Mr. Papa called it a "game changer" for the industry, something about which most industry participants would readily agree. Horizontal drilling and hydraulic fracturing technologies have dramatically altered the near-term supply picture and have forced energy prognosticators to recast their forecasting models. Most of them now are calling into question the need for the U.S. to import as many hydrocarbons as previously thought. Optimism is fine, but euphoria can be dangerous as it tends to create blind spots that become our downfall.

According to Mr. Papa, "There is clearly sufficient North American gas supply to last for a bunch of years; 50 years at least. And there is clearly no need for us to import LNG (liquefied natural gas) for multiple years to come." At the present time, natural gas supplies are swamping the market due to the drop in demand associated with an overall decline in energy consumption due to the lasting effects of the recession and the surge in unconventional supply due to

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The U.S. has stopped adding new LNG receiving terminals and has actually sought and received permission to begin exporting LNG

Each will become very large fields with the smallest having reserves of at least 500 million barrels

accelerated drilling dictated by the need for producers to hold leased acreage for which they have offered huge bonuses.

This view of huge potential supplies of natural gas in this country due to the unconventional resources was prompted by the release of the Potential Gas Committee report last year suggesting that the U.S. has 1,836 trillion cubic feet (Tcf) of potential natural gas resources, of which 616 billion cubic feet (Bcf), or 33.5%, is unconventional. The total increase in potential resources since the Committee's prior report was due to the recognition of the gas shale resources. The report stunned many in the industry and has led many to calculate that the country has 100+ years of gas supply. But as Gil Goodrich, Vice Chairman and CEO of Goodrich Petroleum Corp. (GDP-NYSE), speaking to a group of young energy professionals in Houston, said, "Shale gas reserves and shale gas supply are not the same thing." Finding gas trapped in the shales underlying oil and gas producing basins and extracting it is one thing, but getting it out in an economically profitable manner is something entirely different. Ignoring gas shale profitability today might seem acceptable because of the need for companies to establish large lease acreage positions early, but destroying shareholder capital is never a good business strategy.

As Mr. Papa pointed out, five years ago the consensus called for natural gas prices to trade in the range of \$7 to \$10 per thousand cubic feet (Mcf) because domestic supplies were falling short of meeting demand and we were increasingly dependent on gas supplies from Canada and LNG from abroad. At that time, the prime focus of the large integrated petroleum companies was on tapping the huge gas deposits in the Middle East and Southeast Asia to supply the fuel needs of developed economies. Today, those strategies appear to have been turned upside down as the U.S. has stopped adding new LNG receiving terminals and has actually sought and received permission to begin exporting LNG from the lower 48 states.

Similar events are occurring in the oil market, although not to the same magnitude. After nearly 40 years since U.S. oil production peaked, we are importing about two-thirds of our oil needs. The emergence of the Bakken oil play in North Dakota and other oil shale plays in the Permian Basin and Niobrara has improved the outlook for domestic oil production. As a result of the Bakken production, North Dakota is currently producing 500,000 barrels per day, up from 100,000 barrels a couple of years ago. North Dakota is now the fourth largest oil producing state having passed Louisiana.

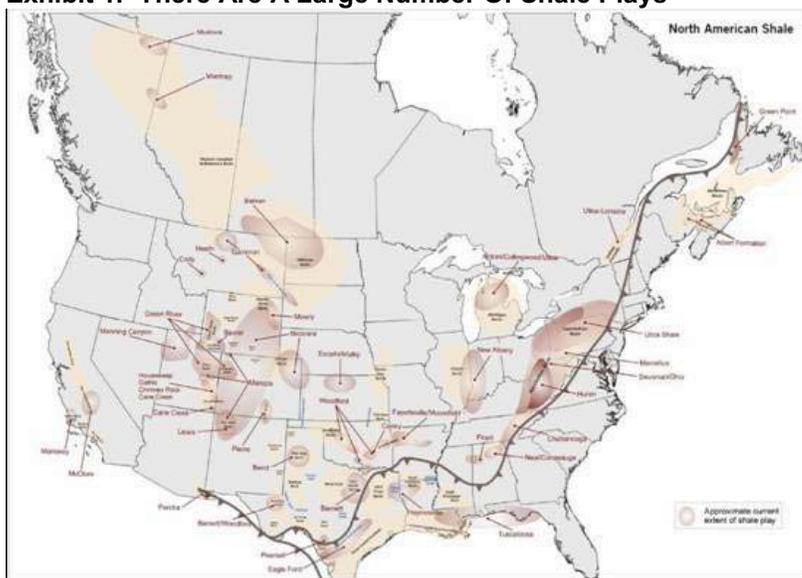
Texas has three prospective oil producing formations – the Eagle Ford in South Texas, the Avalon in the Permian Basin and the Barnett Combo in North Texas. Mr. Papa believes each will become very large fields with the smallest having reserves of at least 500 million barrels. In fact, he believes that when the Eagle Ford is fully

Mr. Goodrich says that unconventional gas production can only grow with increased industry activity such as drilling more wells and drilling wells with longer laterals and increased numbers of fracturing stages

developed it will rank as the nation's sixth largest field including Alaska and the deepwater Gulf of Mexico.

Mr. Papa finds himself on opposite sides of certain issues being debated within the industry. First, he believes that we still have shale formations left to find and that the list will certainly grow after 2012. This is in contrast to Aubrey McClendon of Chesapeake Energy (CHK-NYSE) who has publicly declared that all the shales have been identified. Mr. Papa also is optimistic that unconventional gas production won't collapse in a few years because of the sharp decline in well productivity. This stands in contrast to Mr. Goodrich who says that unconventional gas production can only grow with increased industry activity such as drilling more wells and drilling wells with longer laterals and increased numbers of fracturing stages. He says this conclusion comes from the 70% to 80% first year decline in well production. His biggest concern about near-term production is a slowdown in activity due to low gas prices and high well costs, especially those in the Haynesville with price tags of \$8-\$10 million including fracturing operations that cost \$2-\$3 million per well.

Exhibit 1. There Are A Large Number Of Shale Plays



Source: Marko, Jefferies

Gas shales are world-class resources with low finding and development costs

Another optimistic presentation about natural gas shales was presented by William Marko of Jefferies & Company, Inc. (JEF-NYSE). He focused on the impact that gas shales have had on the merger, acquisition and divestiture (M,A&D) market for producers and properties. His firm has been actively involved as an advisor in eight of the 15 largest gas shale transactions in the past few years. As Mr. Marko sees it, gas shales are world-class resources with low finding and development costs. He estimates that each shale play

Since the biggest initial holders of this acreage are undercapitalized, they will need to raise capital to fund their development needs

Joint ventures are helpful to the sellers because they allow them to obtain capital for drilling and development despite low gas prices, the transactions give the seller's valuation a boost, and they provide a way for the acquirer to obtain expertise in gas shales they could not get otherwise

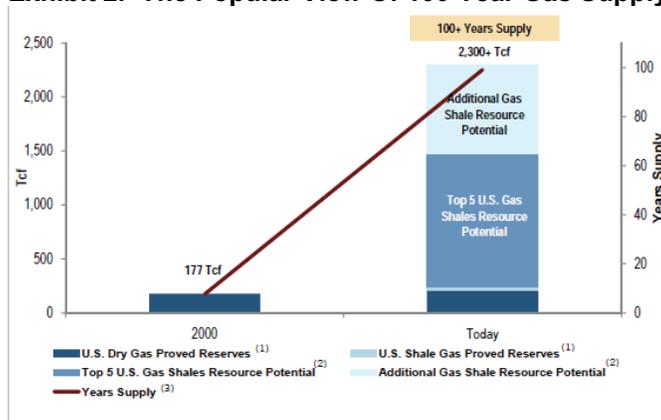
has the potential to contain at least 500 trillion cubic feet equivalent (Tcfe) gas reserves or more with finding and development (F&D) costs in the \$1.00-\$1.25 per thousand cubic feet equivalent (Mcf) range.

In order for these large shale resources to be developed, Mr. Marko estimates \$1.5 trillion will need to be invested over the next 30 years, or \$50 billion a year. Since the biggest initial holders of this acreage are undercapitalized, they will need to raise capital to fund their development needs. They will have to form joint ventures, sell their conventional assets or merge/sell to larger, better capitalized companies in order to meet their capital needs. Clearly, M,A&D transactions in the past 12 months would support that conclusion.

He went on to point out that the M,A&D market had been a \$50 billion a year business for each of 2005 through 2007. The pace was continuing in early 2008 until the financial crisis hit and the market collapsed. Between the fourth quarter of 2008 and the first quarter of 2009, a total of only \$1 billion in transactions were completed.

The attraction for companies to get involved in gas shale joint ventures is that the super integrated oil companies largely missed the shale development because they were focused elsewhere – deepwater Gulf, international offshore and/or Middle East LNG opportunities. Joint ventures are helpful to the sellers because they allow them to obtain capital for drilling and development despite low gas prices, the transactions give the seller's valuation a boost, and they provide a way for the acquirer to obtain expertise in gas shales they could not get otherwise. As Mr. Marko put it, just as the Gulf of Mexico in the 1940-1970 period was the incubator for offshore developments worldwide, the North American gas shales will be the incubator for gas shales worldwide. Given the increasing focus on Eastern European, Chinese and Australian shales, this would seem to be an insightful observation.

Exhibit 2. The Popular View Of 100 Year Gas Supply



Source: Marko, Jefferies

By confusing resources with economic production, this calculation becomes misleading, but then again when you are building a case to attract buyers of acreage or companies focused on gas shales, the misstatement merely slides by

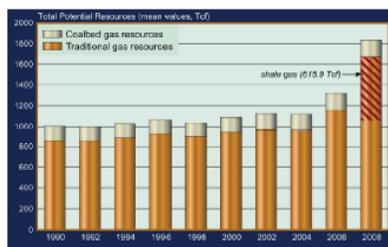
Mr. Marko’s presentation highlighted some of the driving forces for the flood of capital into gas shales. For most of the past 40 years, the U.S. was challenged to keep its gas reserves to annual production at a ten to one ratio. That ratio has changed dramatically as the U.S. now has over 100 years of gas supply at current consumption levels, according to Mr. Marko. By confusing resources with economic production, this calculation becomes misleading, but then again when you are building a case to attract buyers of acreage or companies focused on gas shales, the misstatement merely slides by. On the other hand, the petroleum industry has been characterized by a history of original reserve estimates growing over time. There is a strong likelihood that current gas shale resource estimates will grow over time, but that assumption is currently unproven and a dangerous one to embrace. This generous view of 100+ years of supply as a result of the recognition of gas shale resources has been challenged by Art Berman and rests on distinguishing the difference between resources and economically justified production.

Exhibit 3. Why 100 Years Of Supply Is Wrong

There never was 100 years of natural gas because of shale plays

- Potential Gas Committee June 2009 Report misinterpreted.
- Technically recoverable resources are not reserves.
- Probable shale gas component is 147 tcf.
- That’s a lot of gas but it is not 100-year supply.

Potential Gas Committee 2009 Report	TCF
U.S. Technically Recoverable Resources	1,836
Shale Gas Component	616
"Probable" (P ₂) Technically Recoverable Resources	441
Shale Gas Component	147



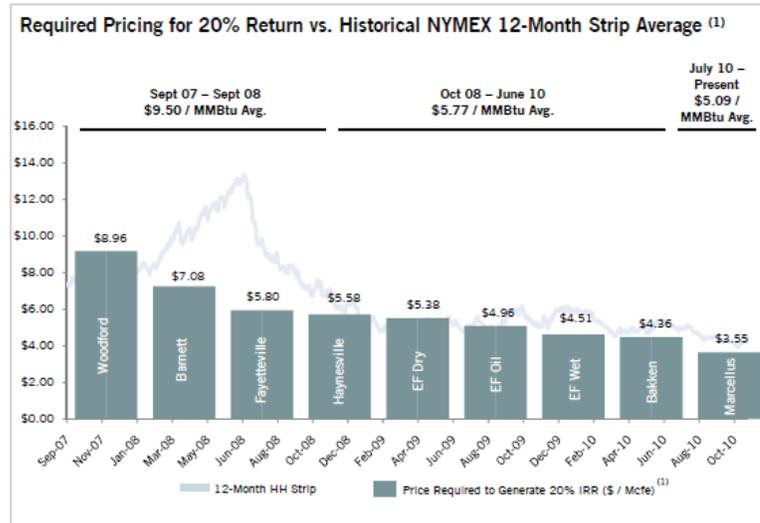
Labyrinth Consulting Services, Inc. From Potential Gas Committee 2009, A 2010 World Oil Conference

Source: Berman, ASPO

At current gas prices, only one – the Marcellus – yields the targeted return

The troubling conclusion from Mr. Marko’s presentation arrives when he calculates the required price to yield a 20% return on investment for the nine shale basins. At current gas prices, only one – the Marcellus – yields the targeted return. But then, everyone believes that current low gas prices are merely a short-term phenomenon caused by too much drilling driven by lease considerations that will ease up by 2012 when the economy is expected to have rebounded from the recession boosting gas demand.

Exhibit 4. \$4/Mcf Gas Prices Kill Gas Shale Economics

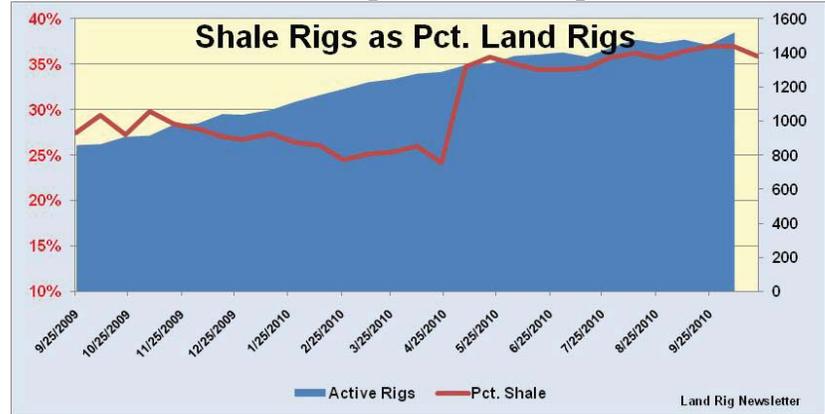


Source: Marko, Jefferies

One presenter we recently heard referred to the current gas oversupply situation as “a period of abundance”

One presenter we recently heard referred to the current gas oversupply situation as “a period of abundance.” But he commented that he didn’t dare use the term “gas bubble” because we all know that the last time the term was employed, the outcome for the natural gas industry was pretty bad! I guess this is the opposite of “build it and they will come.” If you don’t call it what it is, then it won’t happen.

Exhibit 5. Shale-Focused Rig Count Has Surged



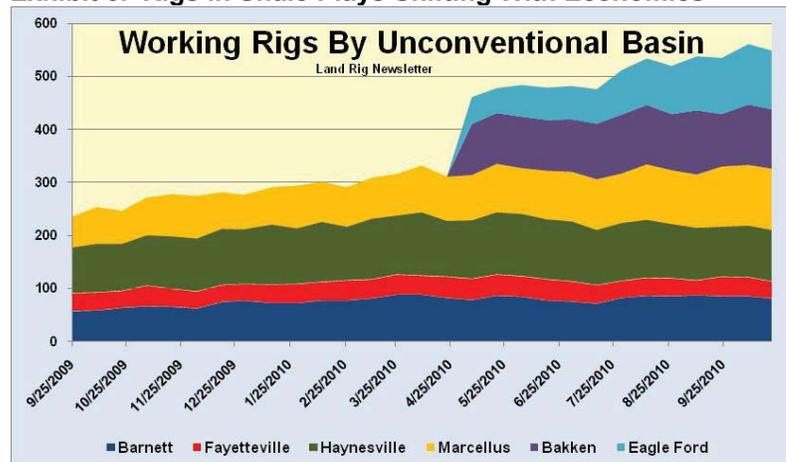
Source: Land Rig Newsletter, PPHB

Mr. Marko suggested that there are 100 rigs drilling now in the Eagle Ford basin but that rig count will peak next year at 200 rigs

The key question for the natural gas market is the pace of drilling in the shale basins. Over the past two years, there has been an explosion in gas shale drilling and now in the more oily-shale plays. Mr. Marko suggested that there are 100 rigs drilling now in the Eagle Ford basin but that rig count will peak next year at 200 rigs. Of course, as he acknowledged, the rig count in the Haynesville is dropping due to the poor economics from high cost wells and low

gas prices. According to one questioner in the audience, his company's drilling engineers had checked with the trucking companies and found that 40 rigs currently drilling in the Haynesville are scheduled to move upon completing their current contracts.

Exhibit 6. Rigs In Shale Plays Shifting With Economics



Source: *Land Rig Newsletter*, PPHB

The result of the high drilling activity and the fracturing capacity tightness has been an increase in drilled-but-uncompleted wells

We have witnessed a strong rebound in gas demand this year as the economy has improved, but also due to warmer weather that has boosted electricity consumption

Another problem for gas production is, and continues to be, a shortage of equipment to perform hydraulic fracturing treatments. Every company engaged in this business is adding new equipment, but the order backlog has strained the component manufacturers and the equipment fabricators. In addition, due to the depths and pressures encountered in many of these gas shales basins, pumping equipment is wearing out faster than normally, adding to the pressure to expand fracturing fleet capacities. The result of the high drilling activity and the fracturing capacity tightness has been an increase in drilled-but-uncompleted wells. No one knows exactly how large this backlog is, but knowledgeable guesses are that it is in the hundreds, and possibly thousands, of wells – possibly enough to keep the fracturing industry busy for a half a year or more even if all drilling stopped. That means there will continue to be high volumes of new gas flows coming on line throughout 2011, which will keep gas prices under price pressure. At the same time, whenever gas prices rise, producers will be incentivized to boost production from wells that currently have their flow choked back in an attempt to ease the economic pain.

As gas supply grows, the question becomes when might gas demand increase? The answer depends upon both the weather and the pace of economic activity. The former factor impacts electric power generation using natural gas while the latter will tell us about likely industrial consumption of gas. We have witnessed a strong rebound in gas demand this year as the economy has improved, but also due to warmer weather that has boosted electricity consumption. For the first seven months of 2010, electricity

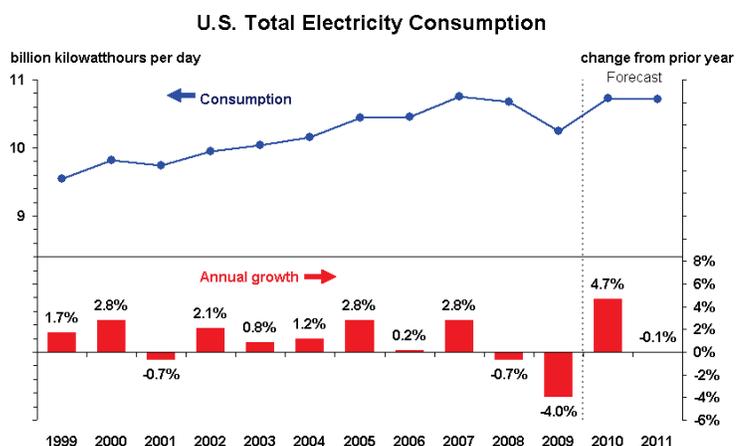
Last summer was 24.5% warmer than normal boosting air conditioning demand

B&V has estimated that electricity consumption lags the rate of improvement in the nation's GDP by two quarters

consumption has increased 4.7% over the same period last year. According to data from Black & Veatch (B&V), heating degree days in December 2009 were 5.2% higher than the prior year while they were 1.9% higher in January 2010. Last summer was 24.5% warmer than normal boosting air conditioning demand. The challenge for electricity and natural gas this winter is to overcome the forecast for warmer than normal temperatures in the more populous regions of the country. The moderate winter is projected to be followed by a cooler summer that will dampen air conditioning demand during 2011.

B&V has estimated that electricity consumption lags the rate of improvement in the nation's gross domestic production (GDP) by two quarters. Given the slowing of the U.S. economy in recent quarters and the recently lowered outlook by the OECD, we would expect the recent surge in electricity demand to moderate just as is forecast by the Energy Information Administration (EIA).

Exhibit 7. Electricity Demand Rebounding Then Slowing



Source: EIA

Source: Short-Term Energy Outlook, November 2010

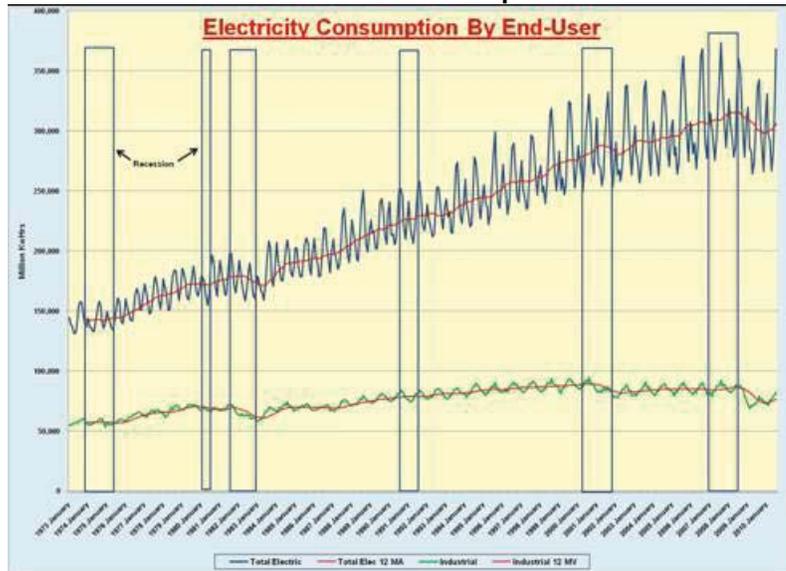
When we look at electricity consumed by industrial users over the same period, we see it has increased by only a little more than 50%

The U.S. has lost much of its heavy industrial manufacturing base and the remaining businesses driving our economy are less power-hungry

A major issue in forecasting gas demand associated with electricity is to understand consumption trends by end-user. When we look at total electricity demand from 1973 to now, it appears to have had a healthy growth rate as reflected by demand having more than doubled over the period. However, when we look at electricity consumed by industrial users over the same period, we see it has increased by only a little more than 50%.

Why the slower growth? One explanation is that the U.S. has lost much of its heavy industrial manufacturing base and the remaining businesses driving our economy are less power-hungry. When we look at manufacturing employment relative to total employment in the U.S. since the 1930s, we see how the nation's economy had changed from then to more recent times. While we may be

Exhibit 8. Industrial Electric Demand Up Less Than Total



Source: EIA, NBER, PPHB

expecting an economic rebound following the latest recession, there is little likelihood we will reverse the long-term downward trend in our manufacturing sector that would boost electricity consumption.

Exhibit 9. Manufacturing Employment Not As Important



Source: St. Louis Federal Reserve Bank

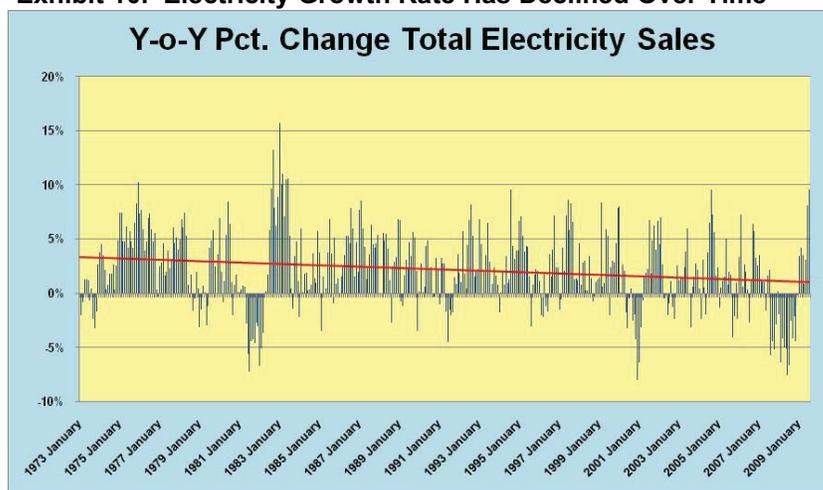
The trend line has declined from close to a 4% a year rate to 1%

Maybe the more telling chart is the one showing the year-over-year change in total electricity demand. While there are wide swings in the positive monthly changes in electric demand, we would note those periods when demand turned negative due to economic recessions. More important is the red trend line for these monthly changes. As can be seen, the trend line has declined from close to a 4% a year rate to 1%. This compares closely with B&V's estimate

It is interesting to note that electricity demand growth rate has trended lower given that we have been living in an age characterized by huge growth in the number of electric gadgets, computers and appliances in homes

that the long-term growth rate in future electricity demand will be 1.1% a year. They see the rate being closer to 1.7% a year for 2010 through 2013 due to the economic recovery, but then they expect it to slow to their long-term growth estimate. It is interesting to note that electricity demand growth rate has trended lower given that we have been living in an age characterized by huge growth in the number of electric gadgets, computers and appliances in homes. We have to believe that despite the increased number of household electronic devices, the most power-hungry among them - air conditioners, refrigerators and clothes dryers - have become significantly more efficient over time.

Exhibit 10. Electricity Growth Rate Has Declined Over Time



Source: EIA, PPHB

It may take considerable time for the industry to overcome the imbalances from too many rigs drilling gas shale wells, the working off of the backlog of drilled-but-uncompleted shale wells, and for gas consumption to grow more rapidly

As more and more people embrace the game-changing nature of shales in North America and decide to wager larger and larger sums of money in exploiting these resources, the absence of a strong U.S. economic rebound will retard any meaningful recovery in natural gas prices. It may take considerable time for the industry to overcome the imbalances from too many rigs drilling gas shale wells, the working off of the backlog of drilled-but-uncompleted shale wells, and for gas consumption to grow more rapidly. Without these three conditions being met, gas producers will continue to wonder whether this period of abundance will morph into another gas bubble similar to the one that haunted the industry in the 1980s.

Correction

In the November 9th, 2010, *Musings* issue, we mistakenly cited Dresser-Rand (DRC-NYSE) as being the target of a takeover when we meant Dresser, Inc.

Fuel Economy And Electric Vehicles – The Future Vision

Fuel economy was up 7%, or an increase of 1.4 mpg, from the fleet's performance in 2008

With the hype for electric vehicles (EV) building it was noteworthy to see the recent report by the Environmental Protection Agency (EPA) on the nation's vehicle fleet fuel efficiency performance for 2009. The report showed that the domestic fleet of cars, vans, pickups and SUVs recorded an average fuel efficiency rating of 22.4 miles per gallon (mpg). That was up 7%, or an increase of 1.4 mpg, from the fleet's performance in 2008. While some experts attribute the gain to the impact of the recession, and there is a certain amount of truth to that claim, more attractive small car offerings from auto manufacturers are also contributing to that fuel-efficiency performance.

The EPA report showed that there was a shift in the fleet mix last year. The light truck sector (vans, pickups and SUVs) accounted for only 40% of new vehicle sales, down 7% from 2008 and down 12% from its peak in 2004 when it seemed that every vehicle purchased was either a pickup or SUV. The truck share is now at the lowest share it has been since 1995.

Only Chrysler among the companies slipped in its 2009 fuel efficiency rating, falling to 19.2 mpg from 19.3 mpg in 2008

American car manufacturers did reasonably well in the EPA ratings with 14 of 15 companies showing fuel efficiency improvements. Only Chrysler among the companies slipped in its 2009 fuel efficiency rating, falling to 19.2 mpg from 19.3 mpg in 2008. The Asian car manufacturers showed outstanding performance as Toyota (TM-NYSE) boosted its fleet average by 2.6 mpg to 25.4 mpg. Likewise, Nissan (NSANY.PK) increased its rating to 23.6 mpg, a year-over-year improvement of 1.7 mpg.

The EPA report also showed that the high-mileage hybrid vehicle share of the fleet fell to 2.3% from 2.5% in 2008

One reason for the fuel efficiency gain was the reduction in vehicle weights, which is directly linked to improved mileage gains. The average vehicle weight fell 4% last year or a drop of 168 pounds to an average vehicle weight of 3,917 pounds. The average truck weight was 100 pounds lower while that of cars was down 60 pounds. Fewer pounds needing to overcome inertia boosts vehicle fuel economy. This was an important development as the EPA report also showed that the high-mileage hybrid vehicle share of the fleet fell to 2.3% from 2.5% in 2008. The decline was attributed to the fact that hybrid vehicles are more expensive compared to their gasoline-powered counterparts.

The diesel vehicle share of the fleet, however, increased from 0.1% in 2008 to 0.5% in 2009, which says something about the growing success of the new clean diesel engine technologies being adopted from European models. The driving performance of these diesels has also contributed to their increased market penetration, albeit still a minuscule segment, along with the ubiquitous diesel pumps at service stations nationwide.

With the traditional fleet fuel-efficiency improving, one has to wonder

Nissan's CEO Carlos Ghosn has publicly stated that he believes EVs will capture 10% of American auto sales in the very near future

about the EV hype. Nissan's CEO Carlos Ghosn has publicly stated that he believes EVs will capture 10% of American auto sales in the very near future. I'm sure he is counting on his company's entrant – the Leaf – contributing to that success. GE's (GE-NYSE) Chairman and CEO Jeffrey Immelt is doing his best to help make the EV optimism come true with the announcement that his company plans to purchase 25,000 EVs over the 2011-2015 model years to replace the company's vehicle fleet. But observations from the leading hybrid technology company, Toyota, call that optimism into question.

With range anxiety and a price tag approaching \$40,000 before government subsidies coloring buyers' views of the attractiveness of EVs, Mr. Carter believes the market niche is fairly small

U.S. Toyota division general manager Bob Carter doesn't share Mr. Ghosn's optimism about EVs. While attending a ceremony to introduce his company's RAV4 EV, Mr. Carter said, "Clearly, we see a role for EVs in the market." But he went on to say "we just see a more substantial role for hybrids and plug-in hybrids." His view about the ultimate success of EVs is tempered by what he says is that "most people see EVs as the third car in the driveway." With range anxiety and a price tag approaching \$40,000 before government subsidies coloring buyers' views of the attractiveness of EVs, Mr. Carter believes the market niche is fairly small. As he pointed out, the Toyota Prius is selling 115,000 units so far this year, but it represents just 1.2% of the overall light vehicle market. "We don't see it coming anywhere near 10%, short term," observed Mr. Carter. "That's big numbers."

But the push for EVs continues. Just last week, the Electrification Coalition released its 160+ page [Fleet Electrification Roadmap](#). The purpose of the report was laid out in the preface to the report, which begins with the statement that "The Electrification Roadmap endeavors to serve as practical function: to provide a public policy guide to transforming the U.S. light-duty ground transportation system from one that is oil-dependent to one powered almost entirely by electricity."

"To secure the advantages of electrification, it is not enough to deploy even millions of vehicles. In fact, only penetration rates in excess of a hundred million electric vehicles will be sufficient"

The rationale for the roadmap and its recommendations was further amplified with the following: "Never before have so many resources been brought to bear in support of electrification of transportation. Nonetheless, there is a great risk that the results of these initiatives could be less than the sum of the parts. To secure the advantages of electrification, it is not enough to deploy even millions of vehicles. In fact, only penetration rates in excess of a hundred million electric vehicles will be sufficient." This objective is very aggressive, but if we are to nearly totally electrify our transportation system, significant investments will need to be made.

The report lays out three key goals that the coalition members believe can come from a commitment to electrifying the nation's transportation system. Those goals were laid out in the report's preface: "It is hoped that this report offers policymakers and the public a clear and accessible schematic for converting the vision of electrification into a working system that displaces oil as the nation's

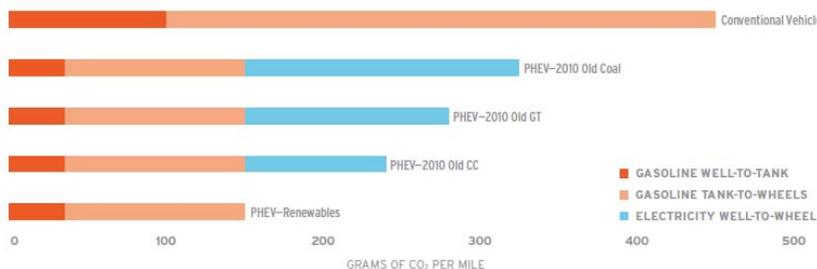
The study concluded that using a PHEV would reduce carbon emissions as compared to petroleum-fueled ICE vehicles, even if all the electricity used to charge the PHEV was generated by a coal power plant

dominant transportation fuel and, in so doing, dramatically enhances energy security, propels economic growth, and reduces carbon dioxide emissions.”

In promoting the goal of cleaning up the atmosphere by switching from internal combustion engines (ICE) powered by hydrocarbon fuels, the Electrification Roadmap relies on a 2007 report published by the Natural Resources Defense Council and the Electric Power Research Institute that conducted a well-to-wheel analysis of several automotive technologies fueled by a range of sources commonly used to generate power. The study concluded that using a plug-in hybrid electric vehicle (PHEV) would reduce carbon emissions as compared to petroleum-fueled ICE vehicles, even if all the electricity used to charge the PHEV was generated by a coal power plant.

Exhibit 11. Clean, Cleaner And Cleanest Vehicles?

FIGURE 10 VEHICLE EMISSIONS BY TECHNOLOGY AND FUEL



Source: Electric Power Research Institute; Natural Resources Defense Council

Source: Electrification Coalition

The report concluded that the typical ICE vehicle emits 450 grams of CO₂, which compares to the 325 grams that a PHEV powered by coal emits - a 25% reduction. The report further concluded that if the PHEV’s electricity charging source was powered by renewables, it would have a 300-gram advantage. If power plants used other fossil fuel generating technologies, the PHEV would still be the cleaner option by a wide margin.

Mr. Petersen points to the new CAFE standards adopted by the EPA and the National Transportation Safety Board last April as making the 2007 study obsolete

John Petersen, a U.S. lawyer based in Switzerland and representing American and European companies engaged in the alternative energy industry, challenged the Electrification Roadmap’s use of this report because he claims it is outdated and based on current regulations, the supposed CO₂ emissions advantage goes away. Mr. Petersen points to the new CAFE standards adopted by the EPA and the National Transportation Safety Board last April as making the 2007 study obsolete and, in his opinion, misleading in its representation of the emissions advantage of PHEVs.

Mr. Petersen points out that if you reduce the ICE 450 grams figure to the 313 grams legislated for 2016, virtually all the advantages of PHEVs go away except for the power coming exclusively from renewables. He then points out that the Prius already has a pump-

Exhibit 12. New CAFE Standards

Model	CO2 Emissions	CO2 Emissions
Year	Pump-to-Wheel	Well-to-Wheel
2012	295 grams per mile	369 grams per mile
2013	286 grams per mile	358 grams per mile
2014	276 grams per mile	345 grams per mile
2015	263 grams per mile	329 grams per mile
2016	250 grams per mile	313 grams per mile

Source: John Petersen, SeekingAlpha

to-wheels CO2 emissions rating of 89 grams per kilometer, or 143 grams per mile and a well-to-wheel rating of 179 grams per mile. As he puts it, “the only plug-in that can claim parity with the Prius, much less superiority, would be one equipped with a built in wind turbine.”

As he points out, if the CEOs who are members of the Coalition published such information in their SEC documents, they would have serious problems

While Mr. Petersen is sympathetic with the objectives of the Electrification Coalition to publish information and policy recommendations, he also believes it has an obligation to report accurate and balanced information. As he points out, if the CEOs who are members of the Coalition published such information in their SEC documents, they would have serious problems. While we would like to agree, based on our experience with the SEC, it isn't always as much of a stickler for candor and honesty as Mr. Petersen believes.

Northern Hemisphere Wind Speeds – Wind Energy Problem?

The study concluded that average annual surface wind speeds over the past 30 years in countries in the mid-northern latitudes – principally the United States, China and Russia – had decreased as much as 15% from 10.3 miles per hour to 9 miles per hour

An article in the October 17th issue of *Nature Geoscience* focused on slowing wind speeds in the Northern Hemisphere and it generated a swift reaction from wind energy proponents. The study was prepared by a team of climate researchers in Europe led by Robert Vautard of the Climate and Environment Science Laboratory in France, along with scientists from the European Centre for Medium-Range Weather Forecasts. The study concluded that average annual surface wind speeds over the past 30 years in countries in the mid-northern latitudes – principally the United States, China and Russia – had decreased as much as 15% from 10.3 miles per hour (17 kilometers per hour) to 9 miles per hour (14 kilometers per hour). The authors of the study surmise that wind speeds in the Southern Hemisphere are probably slowing, too. Their belief is based on the known linkage of winds in different parts of the globe. That conclusion also may be supported by recent data from Australia showing a mysterious slowing of surface winds.

According to Michael Brower, chief technical officer of AWS

“As far as we can determine, average wind speeds in locations and at heights of interest for wind energy have been neither decreasing nor increasing in a statistically significant way in most parts of the world”

Based on the data from the remaining 822 stations, the study concluded that average annual wind speeds had declined from 1.8% to 5.9% over most land surfaces in the Northern Hemisphere

“Such measurements are notoriously unreliable for long-term wind studies because of changes over the years in measurement equipment, instrument heights and locations, and surroundings”

What Dr. Brower concludes is that the reason for the decrease in average annual wind speed in the U.S. is its measurement and not its actual speed

Truepower, LLC (AWS), a wind energy consulting firm, “As far as we can determine, average wind speeds in locations and at heights of interest for wind energy have been neither decreasing nor increasing in a statistically significant way in most parts of the world.” Mr. Brower’s quote came from his firm’s November 9th press release criticizing the conclusions of the *Nature Geoscience* study. To further emphasize the firm’s disagreement with the study, where it referred to two other European wind speed studies that disagreed with the study’s conclusions, the sentences in the AWS press release citing the disagreements were underlined. We were amused by the critique since it appears to mirror the reaction in recent years from global warming supporters when challenged by skeptics pointing out the flaws in the temperature data and analyses supposedly showing the global warming.

One of AWS’ criticisms dealt with the data utilized in the wind speed study. The study’s scientists reviewed wind speed data collected from 5,412 surface stations around the globe. Acknowledging that there could be problems with the collection of the data making it highly unreliable, the study’s authors employed various quality-control measures that wound up excluding data from 85% of the stations. Based on the data from the remaining 822 stations, the study concluded that average annual wind speeds had declined from 1.8% to 5.9% over most land surfaces in the Northern Hemisphere.

Dr. Jeff Freedman, a senior research scientist at AWS, commented on the data used in the wind speed study. “The key problem with these reports is that they focus mainly on findings based on surface wind speed measurements taken at airports and the like. Such measurements are notoriously unreliable for long-term wind studies because of changes over the years in measurement equipment, instrument heights and locations, and surroundings.” In the United States, for example, nearly all airport weather stations were moved in the past 15 years from 6.1 meter masts (20 feet) to 10 meter ground masts (33 feet), the current international standard, and automated data recording was introduced.

Dr. Brower commented on the impact of these changes in wind data collection stations. “It is well known in the U.S. wind industry that these changes have resulted in marked discontinuities and inconsistencies in surface wind measurements – and most often a drop in the reported average wind speeds.” So what Dr. Brower concludes is that the reason for the decrease in average annual wind speed in the U.S. is its measurement and not its actual speed.

Dr. Brower goes on to point out that “in much of the rest of the world, inconsistent maintenance practices and encroaching urbanization have caused substantial declines in observed wind speeds in many locations. Because they are so pervasive, such trends are often difficult to detect and remove even with the most stringent quality-control routines.” Once again, Dr. Brower attacks the quality of the

The NCEP/NCAR data concluded that there was no significant trend in wind speeds over the past 30 years

wind speed data used in the study and the authors' attempts to control for the lack of data quality and consistency.

The *Nature Geoscience* study authors also evaluated in their paper two other data sources, neither of which supported their findings. They examined the NCEP/NCAR global reanalysis data and the ECMWF ERA-interim reanalysis data sets, both of which are outputs of weather models employing data from a wide range of sources. The NCEP/NCAR data concluded that there was no significant trend in wind speeds over the past 30 years. The ECMWF data showed that the rate of decrease in average annual wind speeds was 50% to 90% smaller than the surface observations over the past 20 years. Of note is that these were the conclusions highlighted through underlining in the AWS press release. Based on our experience, we are always skeptical of data derived from computer models.

AWS went on in its press release to note that it had reviewed several published and unpublished studies on long-term wind speed trends on both regional and global scales. AWS scientists have found that the results of these studies are inconclusive for a number of reasons, including: 1) the limited number of surface stations with long-term, continuous, homogenous wind speed records; 2) inconsistencies between regions and within similar periods of the observed wind speed trends; 3) discrepancies with reanalysis data and weather balloon observations; and 4) the fact that the heights and locations of most surface weather stations are not representative of wind energy projects.

That conclusion is based upon the observation that in those regions of the Northern Hemisphere experiencing the greatest wind speed declines there has also been the largest increase in plant growth

The key conclusion of the *Nature Geoscience* study is that slowing wind speeds appear to be correlated to increases in surface roughness caused principally by tree growth. The study suggests that tree growth could explain 25% to 60% of the observed decrease in wind speeds. That conclusion is based upon the observation that in those regions of the Northern Hemisphere experiencing the greatest wind speed declines there has also been the largest increase in plant growth. For those regions in North America and Europe experiencing wind speed declines, there have been deliberate reforestation efforts underway. That is not the case in Russia, however, where the impacted areas mainly reflect the return to nature of cultivated farm land due to changes in agricultural practices following the fall of the Soviet Union in the 1980s.

The study raises questions of whether the explanation for the wind speed decrease is due to reforestation efforts or the result of climate change

The study raises questions of whether the explanation for the wind speed decrease is due to reforestation efforts or the result of climate change. The authors worry that if it is due to climate change then there could be an impact on wind speeds at greater heights. Dr. Freedman of AWS says this is not likely to be a problem. He stated, "Wind speeds at the height of modern large turbines (typically 70 to 90 meters, or 230 to 330 feet, above ground) are much less influenced by surface conditions than they are at the 10-meter (33-foot) height of most of these measurements."

The problem is that the conclusions and observations of this study are not sitting well with wind energy proponents

As Mr. Vautard opined in regard to the *Nature Geoscience* study's conclusions, "We are not saying it's a good or bad thing. We are just observing it and trying to explain it." The problem is that the conclusions and observations of this study are not sitting well with wind energy proponents. Could this become the next climate change battleground? It certainly could have serious implications for the Obama administration's green energy initiatives and the efforts of alternative energy proponents to secure additional government subsidies for wind energy projects. We note that wind projects have yet to prove that they are economically viable without significant government subsidies.

Taxes And A Rapidly Changing Ethanol Market

What happens in Congress in these next several weeks or early in 2011 will determine the fate of many "green" energy investments

The lame duck Congress is engaged in a battle over whether or not to extend the 2001 and 2003 tax cuts for individuals. Caught up in that struggle is the fate of many business tax concessions and credits including one for the production of biofuels, which includes ethanol. What happens in Congress in these next several weeks (before closing up shop until the new Congress takes over in January) or early in 2011 will determine the fate of many "green" energy investments. Without some amount of subsidy, alternative energy projects will become prohibitively expensive and their owners are likely to decide to not move forward with them. Will this be a good or bad thing? Does the future of alternative energy supplies rest on these tax decisions?

The push for the credits was offered as one way for promoting cleaner gasoline and diesel fuels and helping clean-up the environment

One of the principle beneficiaries of federal tax credits has been biofuels. While these subsidies have been used primarily to help politicians cement their support with citizens in agriculturally-dominant states, the push for the credits was offered as one way for promoting cleaner gasoline and diesel fuels and helping clean-up the environment. In the case of corn-based ethanol, a mandated component in our vehicle fuel supply, not only have tax subsidies become a political "hot potato" but they have triggered an intense debate over whether corn-ethanol is causing inflation in food prices. While this debate would seem to be limited to this country, a new consideration has entered the picture – the use of federal tax credits as a financial subsidy for companies exporting ethanol.

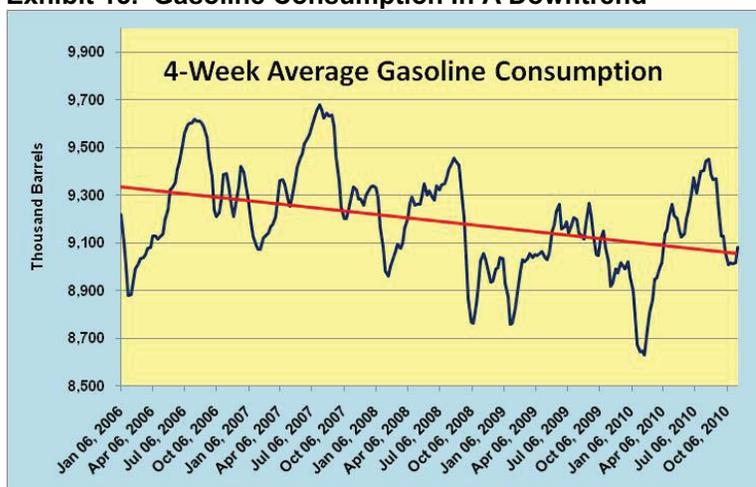
That mandate was established at 10% by volume of the gasoline pool, but with mandated targets increasing for the amount of ethanol to be blended each year

The federal government has had in place a Renewable Fuels Standard (RFS) that mandates the use of ethanol, made either from corn or another plant source, in the nation's gasoline pool. That mandate was established at 10% by volume of the gasoline pool, but with mandated targets increasing for the amount of ethanol to be blended each year. The target ethanol volumes were established well before the explosion in crude oil prices in 2008 that produced record high gasoline prices and contributed to the economic recession, which ultimately led to reduced gasoline consumption.

Some gasoline refiners and retailers have suggested that the nation's gasoline consumption peaked in 2007

Since 2006, the trend in the 4-week average for gasoline consumption has been down. From an average of around 9.3 million barrels per day (mmb/d), gasoline consumption today has fallen to about 9.1mmb/d. High prices and the recession have crimped the number of miles driven. The mileage also has been impacted by the increased fuel-efficiency of new autos entering the nation's vehicle fleet. Some gasoline refiners and retailers have suggested that the nation's gasoline consumption peaked in 2007 as more fuel-efficient vehicles including those powered by natural gas and electricity, an increased volume of biofuels mandated in the fuel supply and slower economic activity reduced driving. The lack of gasoline consumption growth is causing a problem for ethanol refiners.

Exhibit 13. Gasoline Consumption In A Downtrend



Source: EIA, PPHB

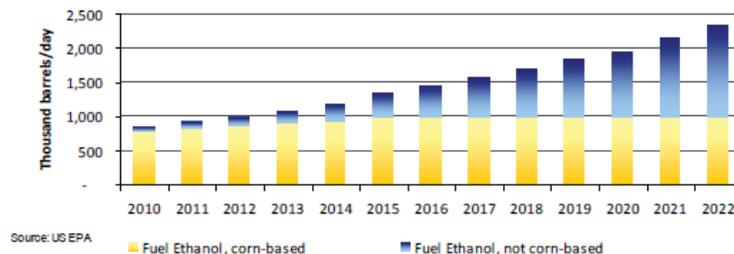
How do you blend four times the volume of ethanol when gasoline consumption is likely to remain stagnant?

Ethanol refiners, who saw growing gasoline consumption, armed with a hefty tax subsidy, were ready, willing and able to build new plants to supply the ethanol volumes needed for the nation's gasoline supply. Under the RFS, in 2008 there were nine billion gallons of ethanol blended into the gasoline supply. Today, the blending volume is targeted to reach 12 billion gallons. The total is legislated to increase to 15 billion gallons in 2015 and 36 billion gallons in 2022. Therein lays a problem. How do you blend four times the volume of ethanol when gasoline consumption is likely to remain stagnant?

The easiest solution was to get the government to mandate a higher percentage of ethanol in the nation's fuel supply

The easiest solution was to get the government to mandate a higher percentage of ethanol in the nation's fuel supply. The effort began with a petition in March 2009 from a group of ethanol producers to the Environmental Protection Agency (EPA) urging it to boost the ethanol content from 10% to 15%. After more than a year of research and testing, the EPA announced a partial waiver in the ethanol blending mix, shortly before November's mid-term elections.

**Exhibit 14. Ethanol Volumes Programmed To Rise
Mandated Ethanol Inclusion in US Gasoline**



Source: **Poten & Partners**

The partial waiver allows, but does not mandate, light-duty vehicles from model year (MY) 2007 and newer to use E-15 (15% ethanol content). Vehicles built in MY2000 and earlier are not allowed to use E-15. A decision on the use of E-15 in vehicles built in MY2001 to MY2006 has been deferred until the EPA reviews data from tests currently being conducted.

They are concerned that no adequate safeguards exist to prevent owners of engines that cannot properly operate on E-15 from filling up with E-15 blends and thus damaging the engines

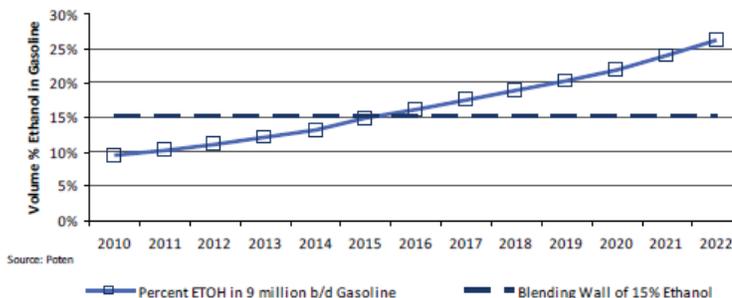
The EPA reviewed the performance of E-15 based on four criteria: 1) tailpipe emissions; 2) evaporative emissions; 3) material compatibility; and 4) ability to drive and operate the vehicle. The waiver did come with a condition that the parties involved in manufacturing and selling E-15 must submit plans for reducing the potential for mis-fueling. This latter condition is especially taxing for retailers who face significant investment in new pumps and storage tanks. The waiver is being fought by a number of small engine manufacturers. They are concerned that no adequate safeguards exist to prevent owners of engines that cannot properly operate on E-15 from filling up with E-15 blends and thus damaging the engines. They are also concerned because there is no guarantee that gasoline with less than 10% ethanol will even be available. No one knows whether the EPA will act on these concerns.

The hydrocarbon component could decline by nearly 20% by 2020 based on current conditions

What is clear about the ethanol mandate and stagnant gasoline consumption is that the hydrocarbon component of the future gasoline supply will decline due to the increased mandate. The hydrocarbon component could decline by nearly 20% by 2020 based on current conditions. If weekly gasoline consumption remains stable at about 9mmb/d and is composed totally of E-10 then the mandated increase to E-15 would result in ethanol hitting a blending-wall in 2015, meaning it will have saturated the entire gasoline supply.

One possible offset to ethanol hitting the blending-wall and forcing the EPA to have to issue another waiver allowing for an even higher ethanol blending percentage would be more flex-fuel vehicles. These vehicles are built to run on either regular gasoline, E-85 (85% ethanol content) or any ethanol blend in between. These vehicles

Exhibit 15. Ethanol Might Hit Blend-Wall In 2015
Hypothetical Timeline



Source: Poten & Partners

The result of the ethanol mandate and a declining hydrocarbon share in the nation’s gasoline supply is that we will see less crude oil and gasoline imported in the future

could siphon off some of the ethanol overflow that cannot be blended into the E-15 fuel supply. Without a surge in new flex-fuel vehicle sales, however, ethanol refiners will be faced with several challenges. These include whether the EPA will mandate MY2001 to MY2006 vehicles to use E-15, how consumers react to the higher E-15 pump price and fewer miles per gallon compared to the price and performance of E-10, and how E-15 integrates with new car warranties. The result of the ethanol mandate and a declining hydrocarbon share in the nation’s gasoline supply is that we will see less crude oil and gasoline imported in the future. That’s bad news for tanker owners.

Will Congress extend the ethanol blending tax credit of \$0.45 per gallon that is scheduled to expire December 31, 2010?

Will Congress extend the ethanol blending tax credit of \$0.45 per gallon that is scheduled to expire December 31, 2010? Potentially influencing this debate, besides the political need for agricultural subsidies for corn growers, will be the growing exports of ethanol and the resulting legal threats from abroad. Ethanol refiners, faced with growing supplies and stagnant demand, must resort to either storing more product or finding new markets, hence the lobbying effort for an E-15 or higher mandate. Exports is another outlet.

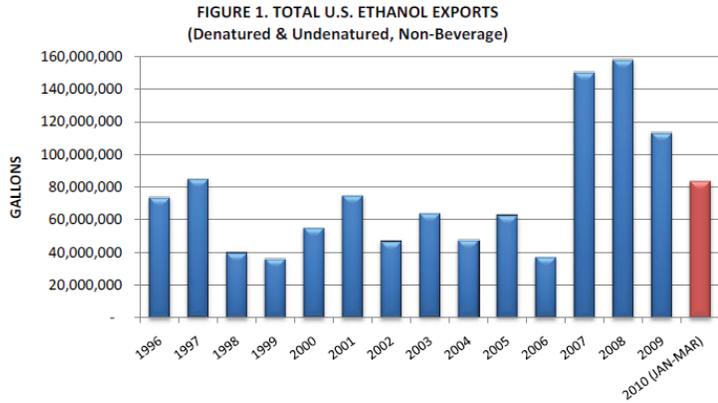
Through the first nine months of 2010, the U.S. exported 251 million gallons of ethanol or nearly twice the volume exported in last year’s comparable period

Through the first nine months of 2010, the U.S. exported 251 million gallons of ethanol or nearly twice the volume exported in last year’s comparable period. In fact, last year was the first year the U.S. became a net ethanol exporter. The actual volume of ethanol exported, however, may be understated because ethanol blended into gasoline supplies that in turn are exported is not counted as exported ethanol.

The U.S. ethanol export market has been particularly helped this year by the rise in sugar prices worldwide

A critical ingredient in the profit calculation driving ethanol export decisions is the blending tax credit. That credit, plus incentives offered by certain foreign governments for ethanol imports, can spell the difference between healthy and marginal profits. The U.S. ethanol export market has been particularly helped this year by the rise in sugar prices worldwide that boosted the cost of ethanol production in Brazil that is based on sugar cane. In addition, the

Exhibit 16. Ethanol Exports Rising Rapidly In 2010



Source: USDA GATS system (based on Dept. of Commerce, U.S. Census Bureau)

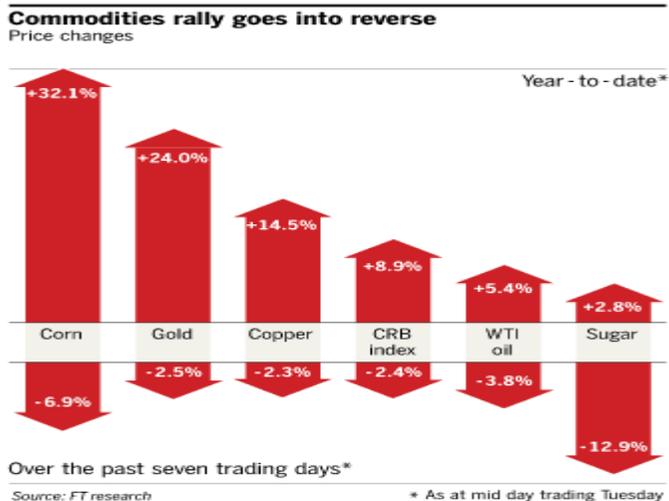
Source: **Poten & Partners**

Brazilian currency has appreciated against the U.S. dollar further contributing to Brazilian ethanol being less competitive globally.

Commodity traders wonder whether the commodity price correction is merely a profit-taking opportunity or a change in the direction of prices overall?

The conditions that propelled sugar and other commodity prices higher this year were reversed on Friday, November 12th when China reported a surprisingly higher inflation rate that sparked investor concern about the government instituting tighter financial regulations that would slow China's rate of raw material consumption. Commodity traders wonder whether the commodity price correction is merely a profit-taking opportunity or a change in the direction of prices overall? If the latter, Brazil's ethanol might then become more competitive in world markets altering the outlook for U.S. ethanol exports even with tax subsidies.

Exhibit 17. Commodity Rally Stopped By China News



Source: **Financial Times**

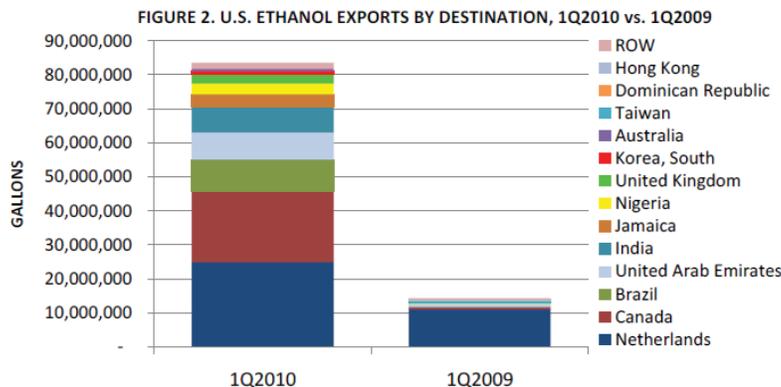
As a result of the growing volume of ethanol exports from the U.S. to Europe, Mr. Vierhout warned of legal actions to halt shipments subsidized by the tax credits

Approximately 38% of the crop, or nearly four of every ten bushels, will be consumed in producing ethanol

A growing issue for ethanol exporters is the growing criticism by foreign ethanol suppliers about the unfair competitive advantage U.S. ethanol refiners have with the blender tax credit. According to Rob Vierhout of ePure, a European ethanol trade association, “The blender’s credit was not set up with the intention to facilitate exports.” As a result of the growing volume of ethanol exports from the U.S. to Europe, Mr. Vierhout warned of legal actions to halt shipments subsidized by the tax credits.

U.S. ethanol refiners are also struggling to refute criticism that they are responsible for the rise in corn prices and, in turn, food prices. The U.S. Agricultural Department estimates that this year’s corn crop will total 12.5 billion bushels. Approximately 38% of the crop, or nearly four of every ten bushels, will be consumed in producing ethanol. Farmers claim that corn crop yields have doubled over the past 40 years to 165 bushels per acre. They expect yields to push toward 200 bushels per acre by 2030 and, with advancements in farming practices, plant breeding and biotechnology yield, could rise closer to 300 bushels per acre. Moreover, farmers point to continued large corn exports as proof that rising ethanol consumption is not a prime factor driving up corn futures prices to two-year highs before November 12th’s price correction.

Exhibit 18. Ethanol Exports Growing Worldwide



Source: USDA GATS system (based on Dept. of Commerce, U.S. Census Bureau)

Source: **Poten & Partners**

The industry claims that the 12 billion gallons of ethanol used this year will displace the need for about 400 million barrels of crude oil that would otherwise have been needed to meet U.S. gasoline demand

The ethanol industry also is pressing its role in national security, a tenet upon which the industry was initially founded. Ethanol was originally perceived as a way to reduce this country’s reliance on imported crude oil needed to satisfy our transportation fuel needs. The industry claims that the 12 billion gallons of ethanol used this year will displace the need for about 400 million barrels of crude oil that would otherwise have been needed to meet U.S. gasoline demand. With a higher ethanol mandate, the industry will be able to displace an even larger volume of imported oil.

The ethanol industry’s best hope on the tax issue is for the question

The biofuel tax credit, overall, reduced U.S. excise tax revenue by \$6 billion in 2009 according to the Congressional Budget Office

to be decided by the lame duck Congress that has a number of legislators sympathetic to the industry's arguments. The biofuel tax credit, overall, reduced U.S. excise tax revenue by \$6 billion in 2009 according to the Congressional Budget Office. With ethanol export volumes running at twice the volume of last year the cost to the federal treasury is likely closer to \$12 billion this year. That amount is roughly 10% of the \$100 billion in budget savings Republican legislators have vowed to achieve in the next Congress. The battle over ethanol may be just beginning.

Offshore Wind Conference Points Out Jobs Problem

A two-day conference on the potential for offshore wind in the Northeast was held last week. The conference, sponsored by the Rhode Island Economic Development Corporation, called Northeast Offshore Wind Summit: Rhode Island 2010, was held in a ballroom atop a downtown Providence, R.I. hotel and drew an audience of 160 elected officials, state bureaucrats and executives from offshore wind developers and manufacturers. The thrust of the program was to bring participants up to date on the developments in the offshore wind business and the potential for participating companies.

All the presentations were described as optimistic about the future of offshore wind in New England

All the presentations were described as optimistic about the future of offshore wind in New England. The highpoint, based on media coverage, was a slide presentation about the recovery in the past decade of the economically depressed port of Cuxhaven in northern Germany due to the explosion in offshore wind energy development in Europe and Scandinavia. The slide show contained pictures of welders welding 400-foot tall steel structures to support offshore wind turbines and of sheets of heavy steel being crunched into cylinders for these structures, among others.

Once again the governor falls back on the power of green energy to create substantial jobs

The slide show was designed to showcase the potential for transformational developments in New England ports such as New Bedford, Massachusetts, the former whaling capital of America, and Quonset, Rhode Island, a former U.S. Navy base. Rhode Island Governor Donald Carcieri opened the conference and commented, "I happen to think that offshore wind can be the next revolution...for economic growth in our state and in our region. Once it happens, it's not just the power that's generated here. It's all the industry that develops around that [wind energy]." Once again the governor falls back on the power of green energy to create substantial jobs. But as the news stories from the conference pointed out, some of the speakers were less optimistic about the potential to create new jobs.

The media highlighted a presentation by Tom Paul, a Rhode Island journeyman electrician who has been unemployed for two years. In September, Mr. Paul, a member of Cranston-based Local 99 of the International Brotherhood of Electrical Workers, and seven of his colleagues, spent a week in Toledo, Ohio, being trained to install

The real problem, however, is that none of these electricians have found work in the wind energy business despite their training and certification

wind turbines. He learned how to splice high-voltage cables, carry equipment up narrow ladders inside turbines and work safely high off the ground. His week produced a certificate to prove he had mastered these skills, but no job. Some 55 electricians, all members of Local 99, cycled through the Toledo training facility from June through September being trained for wind turbines. Reportedly, four times the number of candidates applied for the training than were selected. The real problem, however, is that none of these electricians have found work in the wind energy business despite their training and certification.

The problem with these green jobs is that they are not as real as the proponents of the new industries would have you to believe

The problem with these green jobs is that they are not as real as the proponents of the new industries would have you to believe. A speaker from Deepwater Wind, the developer of a demonstration wind farm offshore Block Island on the coast of Rhode Island, told the conference that it plans to use a fabricator along the Gulf Coast experienced in building structures for the offshore oil and gas industry to build the eight platforms for their project. The platforms will be towed to Rhode Island for installation so there will be few job opportunities associated with this project. The speaker did say that when, and if, they go ahead with the larger, 100-turbine, wind farm off Block Island, they would likely want to construct the platforms locally. Since this project will be located in federal waters, the permitting process will be much longer than for state waters and they will not be sanctioning the project until after the demonstration project has had time to prove up certain assumptions. Since the demonstration project is still subject to a court case in early 2011 and its timetable calls for it to start-up in 2012-2013, we would not be holding our breath for many wind energy construction related jobs in Rhode Island anytime soon.

He said that the 130-turbine Cape Wind project in Nantucket Sound and the two Block Island projects were not large enough to persuade his company to open a factory in the region

The point about the wind market employment situation creating a challenge was echoed by Robert Schubert, an account executive with Siemens AG (SI-NYSE), the world's leading offshore wind turbine manufacturer. He said that the 130-turbine Cape Wind project in Nantucket Sound and the two Block Island projects were not large enough to persuade his company to open a factory in the region. He contrasted the New England offshore wind market with that of the U.K. where the country is planning to build 30 Gigawatts of offshore wind power generating capacity requiring thousands of wind turbines. The latter market is of sufficient size to attract Siemens' interest in building manufacturing plants to meet the turbine demand.

Wind energy proponents have yet to convince citizens that paying significantly higher electricity prices is a good thing

While optimism for the birth of a new energy industry in New England is high, the reality is that it will take longer and have less near-term employment impact than its proponents have projected. Wind energy proponents have yet to convince citizens that paying significantly higher electricity prices is a good thing. As a result, both offshore wind projects, despite federal and/or state approvals and power purchase agreements, still are mired in legal battles that

It is still possible these high-profile offshore wind projects could stall or shrink over their need for improved economics

will delay their final approvals until sometime next year, more than a year later than optimistically anticipated. And even then, there are no assurances that if the developers win their legal battles that the resulting economics will prove as profitable as they had originally expected. It is still possible these high-profile offshore wind projects could stall or shrink over their need for improved economics either through higher power costs, increased government subsidies and/or lower construction costs. The offshore wind saga continues.

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