

MUSINGS FROM THE OIL PATCH

August 31, 2010

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Managing Director

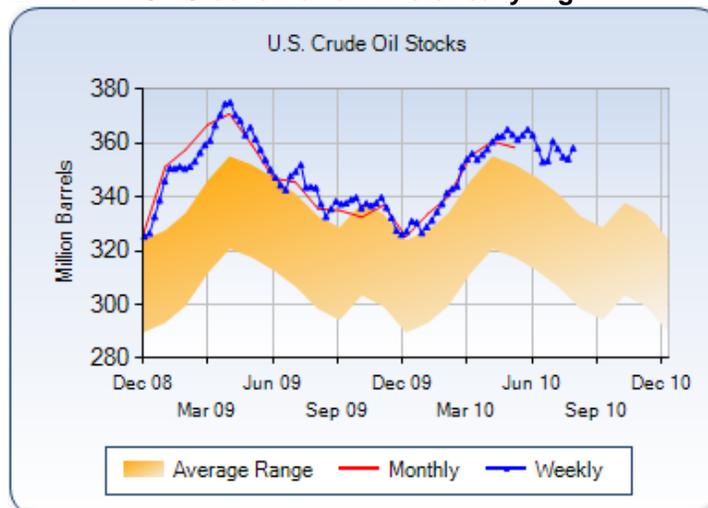
Note: *Musings from the Oil Patch* reflects an eclectic collection of stories and analyses dealing with issues and developments within the energy industry that I feel have potentially significant implications for executives operating oilfield service companies. The newsletter currently anticipates a semi-monthly publishing schedule, but periodically the event and news flow may dictate a more frequent schedule. As always, I welcome your comments and observations. Allen Brooks

Storage Figures And Their Meaning For Oil Markets

The numbers were not encouraging for those oil market forecasters hoping for support for their projections for higher prices

Last Wednesday, the Energy Information Administration (EIA) reported the status of weekly petroleum inventories for the week ending August 20th. The numbers were not encouraging for those oil market forecasters hoping for support for their projections for higher prices. Crude oil inventories for the week increased by 4.1 million barrels. This large increase was against a consensus expectation for only a 300,000 barrel rise. The week's inventory gain was also more than the 5-year average increase of 2.5 million barrels. Crude oil stocks are now 4% above 2009 levels and continue to be above the 5-year range.

Exhibit 1. Oil Stocks Remain Historically High

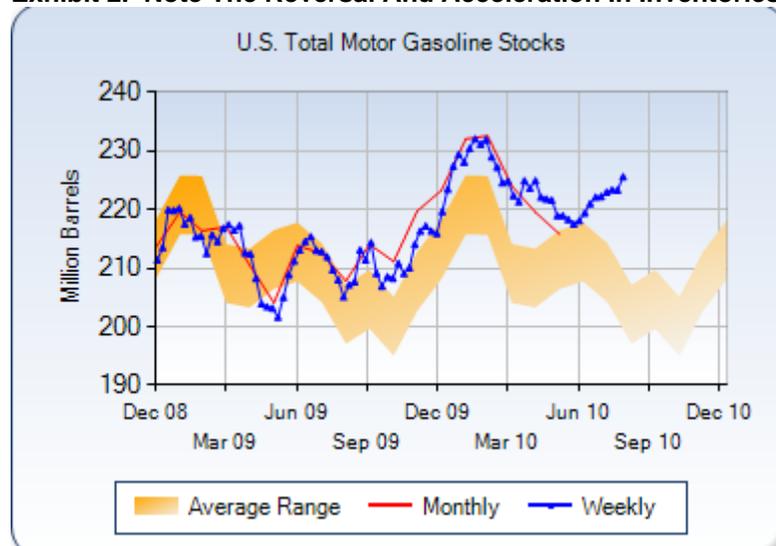


Source: EIA

A build of this magnitude suggests that driving is down

On the product side of the ledger, gasoline stocks rose by 2.3 million barrels, which was well above the consensus expectation of only a 500,000 barrel increase and the 5-year average draw of 3.3 million barrels. As we approach the end of the summer driving season, refineries will switch, or already have switched, to producing less gasoline and more distillate, which is used as home heating oil during the winter. This shift in output is the primary reason why the 5-year average gasoline stock generally reflects a drawdown at this time of August, immediately prior to the Labor Day holiday. A build of this magnitude suggests that driving is down. It may also reflect the inroads of more efficient vehicles into the American fleet meaning more miles can be driven with less gasoline consumption. There is little doubt that last week's gasoline inventory number was bearish for gasoline prices over the next few weeks.

Exhibit 2. Note The Reversal And Acceleration In Inventories

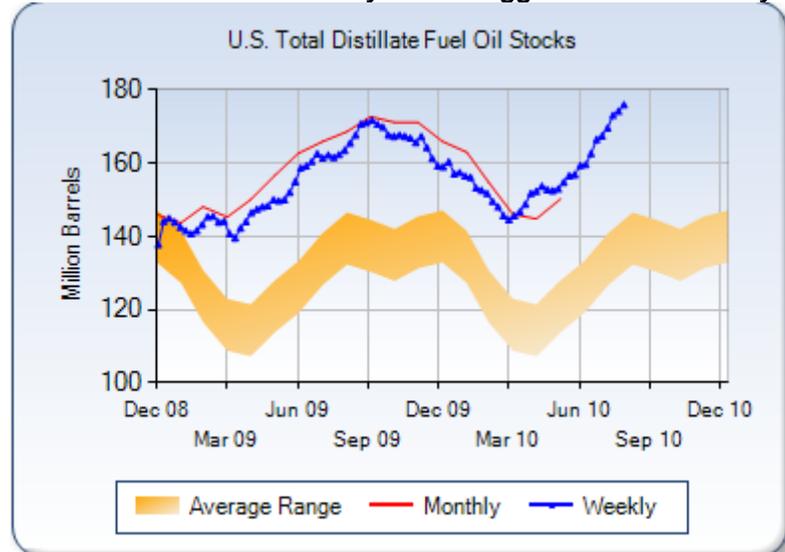


Source: EIA

Outside of the winter months, distillate inventory movements are more a reflection of industrial and transportation demand

Distillate inventories for the week rose by 1.8 million barrels, which was well above the consensus estimate for only a 1.0 million barrel increase and the 5-year average of a 1.3 million barrel draw. Not only are distillate inventories nearly off the chart, they are at modern day record high levels and have been climbing steadily since the end of last winter's heating season. Outside of the winter months, distillate inventory movements are more a reflection of industrial and transportation demand. The timing of the inventory rise during the second quarter was a signal of a weaker than originally reported Gross Domestic Product (GDP) growth estimate. Last Friday the federal government issued its second revision to its estimate of second quarter GDP growth and trimmed the estimate to a 1.6% gain from the prior estimate of a 2.4% increase. As we are now almost to the end of the second month of the third quarter, the steady rise in distillate inventories suggests that the weak economic data that has been reported in recent weeks is not likely to be revised upwards.

Exhibit 3. Distillate Inventory Hikes Suggest Weak Economy



Source: EIA

Prices of all petroleum products are now below the level they were at when 2009 ended

The recent weak performance of the petroleum product complex has contributed to the softness in petroleum product and crude oil prices over the past few months. As shown in the chart below covering roughly the last 20 months, all petroleum prices dropped in the April 2010 market correction. From that point forward, petroleum product prices (gasoline and heating oil) have been volatile but essentially have traded within a relatively narrow range. Crude oil, on the other hand, appeared to establish an uptrend following the correction until the past week or so. Prices of all petroleum products are now below the level they were at when 2009 ended.

Exhibit 4. Petroleum Prices Have Weakened Since Spring



Source: EIA

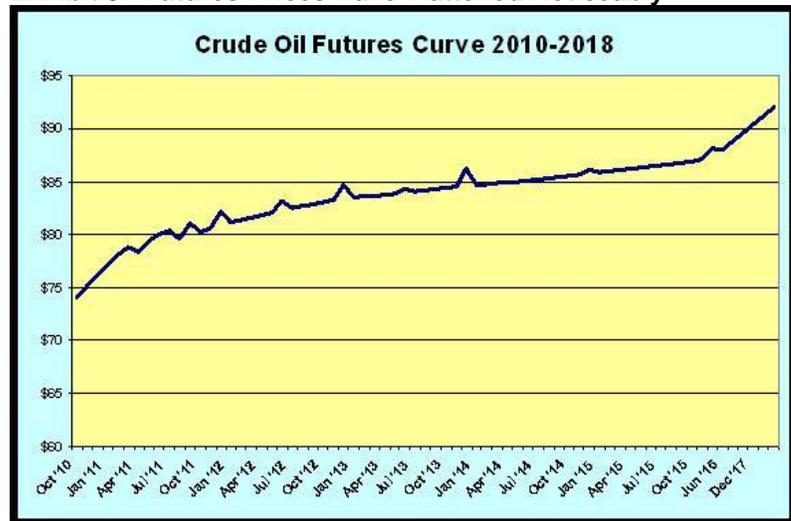
According to some industry reports, offshore oil storage has fallen by 45-50 million barrels at the same time onshore inventories have risen on a global basis by 20-27 million barrels

The world is sensing there is little need to encourage additional oil to be stored and that is why the futures price has flattened considerably since early this year

With onshore inventories at record levels, even though oil stored offshore in tankers has declined, the world appears very comfortable with the oil supply situation. According to some industry reports, offshore oil storage has fallen by 45-50 million barrels at the same time onshore inventories have risen on a global basis by 20-27 million barrels. The inventory drawdown at the same time spot oil prices have been falling and oil futures prices have flattened suggests that the oil market is comfortable with the available supply situation. That comfort has been helped by the weak economic data in the United States and Europe, indications that Chinese apparent oil demand is slowing, although still healthy by most conventional measures, and that available oil supply is holding steady. In fact, it appears OPEC's production surplus is growing, providing further comfort to oil markets that any supply disruptions from storms or geo-political events will not likely create artificial shortages.

Some oil market forecasters have cast the offshore oil inventory drawdown and the modest onshore buildup as bullish for the outlook for petroleum prices. This scenario, however, can also be cast as negative for the future price of oil. It could be construed that what is happening with the changes in inventories and crude oil prices is that the world is sensing there is little need to encourage additional oil to be stored and that is why the futures price has flattened considerably since early this year.

Exhibit 5. Futures Prices Have Flattened Noticeably



Source: CME, PPHB

When contango (sharply higher futures prices than current prices) existed earlier this year, the market was paying for either insurance to have adequate supply or a premium for potential inflation risk. Neither of these issues appears to be a concern as the futures curve is relatively flat for the next several years. None of these issues is a concern to the market because oil supply is adequate as outlined above and inflation concerns have been eased due to the need for global monetary authorities to keep interest rates abnormally low to

This means the market expects the economic malaise gripping the world to continue for some time

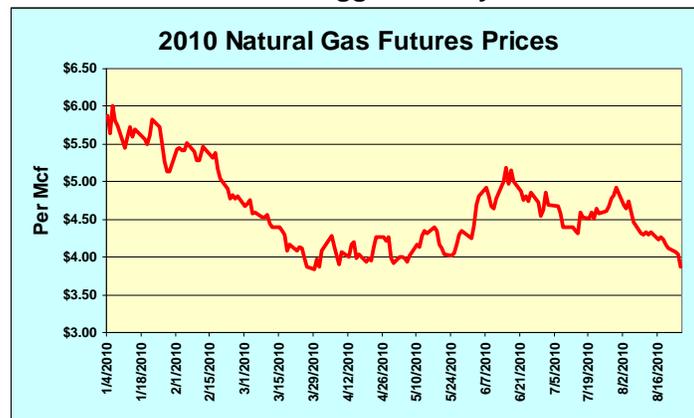
lend support to their economies. As a result, the market is slowly reducing the storage and inflation premiums. In essence the market is also saying that it is reducing future demand expectations and its inflation expectations. This means the market expects the economic malaise gripping the world to continue for some time. It is that sentiment that the International Energy Agency (IEA) commented on its last monthly update when it failed to slash its oil demand forecast but elected instead to warn about the impact on their demand forecast if economic activity fell short of the IEA's assumptions. It's another reason why many people want to employ one-armed economists, but they are in short supply!

The Gas Bulls Of Summer Turn Into Bears

The reality is that these bulls of summer were really merely acknowledging the power of the market

Recently, the last of the raging bulls on natural gas prices traded in their horns for bear uniforms – and we don't mean the Monsters of the Midway variety! By throwing in the towel on gas prices for this year, these bulls-turned-bears then proceeded to claw their future gas price forecast by stating they expected \$6 per thousand cubic feet (Mcf) to be the long-term average. The reality is that these bulls of summer were really merely acknowledging the power of the market as natural gas prices are about two dollars per Mcf below where they were at the start of 2010, and well below the \$7.50/Mcf average gas price the bulls had forecast.

Exhibit 6. Gas Prices Struggle To Stay Out Of The Basement



Source: EIA, PPHB

One by one these pins supporting higher natural gas prices have been removed

Until the spate of dismal economic news last week, futures traders and these bulls of summer had been holding out hope that gas prices would not only be supported above the psychological dangerous threshold of \$4/Mcf by falling production but would rise to lofty levels by fall. Their view was based on the belief that the domestic gas market would be driven by hurricane-deprived supplies, growing industrial and electricity demand from both the recovering economy and the unseasonably hot summer, and an upcoming colder-than-normal winter. One by one these pins supporting higher natural gas prices have been removed.

The importance of Gulf of Mexico supplies for the domestic gas market has been diminished by the growth of onshore gas shale production

The gas-directed rig count continues to hold up despite low \$4/Mcf gas prices. We are finding that the rig count is driven more by the need to drill wells to secure recently purchased leases in the highly prolific gas shale formations around the country rather than react to declining profitability due to low prices and rising drilling and development costs. Hopes for higher gas prices were dashed when the fourth tropical storm of the season, Hurricane Danielle, turned up into the Atlantic Ocean rather than targeting the Gulf of Mexico and our offshore gas producing infrastructure. More tropical storms may be coming, but futures markets are tiring of the emotional rollercoaster of storm formations only to have them fade in significance. Besides, as Deutsche Bank's (DB-NYSE) chief energy economist, Adam Sieminski, points out, the importance of Gulf of Mexico supplies for the domestic gas market has been diminished by the growth of onshore gas shale production. This new and growing source of gas production is not susceptible to being shut down by storms so shortage scenarios are no longer as much a factor in futures pricing as before. Just another crutch for gas traders being kicked out from under them!

Last week's dismal housing statistics and disappointing durable goods orders amplified the prior week's lousy economic statistics strengthening the double-dip recession camp of economists. Statements by several Fed governors about the increasing risk of a double-dip recession didn't help the mood on Wall Street or in the commodity trading pits. Mixed economic data from China added to the gloomy outlook.

Commodity Weather Group calls for the winter of 2010-11 to be the warmest winter since 2006-07

Another development last week was that several weather forecasting services issued updates to their forecasts for the upcoming winter season. The one we follow, Commodity Weather Group, LLC, calls for the winter of 2010-11 to be the warmest winter since 2006-07. They expect energy demand to be lower than normal for the key population centers along the East Coast extending throughout the Southeast and even into many of the Midwest population centers. They believe the best opportunity for colder temperatures, and higher energy demand, will be in the Western United States, especially the Pacific Northwest and Western Canada including Calgary. Their model suggests as much as 20% above normal snow fall in the Pacific Northwest region suggesting that hydro-electric supplies could be substantially above normal, which would hurt fossil fuel demand, most likely natural gas use.

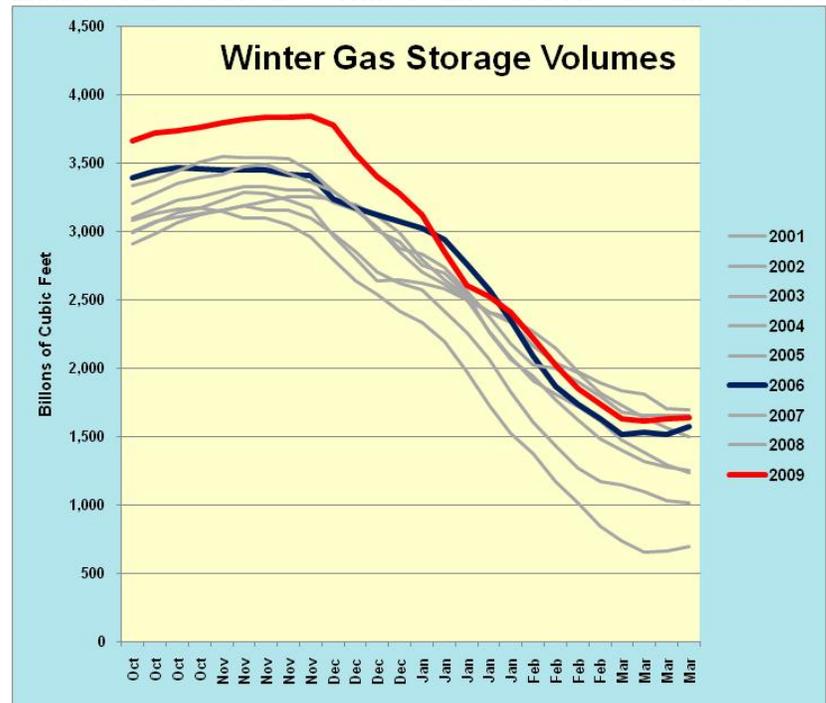
Normally strong La Nina events are associated with cold winters in the Midwest and Northeast regions

CWG's model, driven by numerous factors, runs counter to the normal prevailing climate pattern from strong La Nina events. La Nina is associated with a significant cooling of waters in the central tropical Pacific Ocean region. Normally strong La Nina events are associated with cold winters in the Midwest and Northeast regions. This year, even though CWG expects La Nina to be quite strong, it sees other weather factors that will offset its effect and produce a warmer-than-normal winter.

There was more natural gas in storage at the beginning of last winter and due to warm weather and surging gas shale production supplies grew through November

What does a warmer winter mean for natural gas prices? If we look at gas demand during the winter period of October through March of each year of this decade as reflected by the amount of natural gas in storage, we can see how last winter, a colder than normal season, compared to the warmer than normal 2006-07 winter. In the exhibit below, there was more natural gas in storage at the beginning of last winter and due to warm weather and surging gas shale production supplies grew through November. Then, when the cold weather arrived in December, gas storage volumes fell rapidly despite higher gas production until reaching a bottom at the end of February.

Exhibit 7. 2006 And 2009 Winters Ended At About Same Place



Source: EIA, PPHB

If we do wind up with more gas in storage than the natural gas market will be looking at prices under pressure for most of 2011

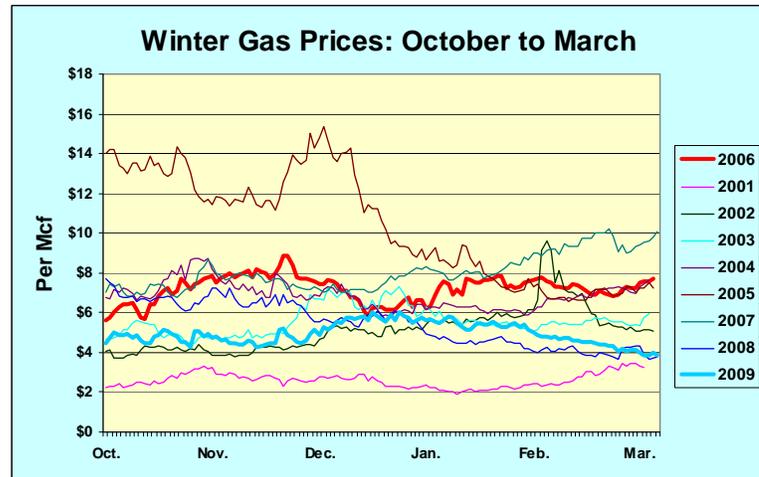
In contrast to 2009-10, gas in storage during 2006-07 peaked about mid October and then steadily declined until bottoming at the end of February. When we look at the patterns and the current storage volumes, we suspect that this winter will begin with gas storage near, or possibly higher, than where 2006-07 began despite the hotter than normal summer we have been experiencing. If the winter is warmer than 2006-07 and with continued strong gas shale production, we should expect the shape of the storage volume graph for this winter to resemble the curve for 2009. The question will be just how warm the winter is as to whether we end up with higher gas volumes in storage at the end of the winter. If we do wind up with more gas in storage than the natural gas market will be looking at prices under pressure for most of 2011. That is not an appealing scenario for natural gas producers.

Turning to gas prices during the winter of 2006-07, we find that on

If we experience a similar price pattern for natural gas this year and winter, then we could be looking at gas prices in the mid-\$3 range at the turn of the year

January 3, 2006, natural gas futures prices were \$10.63, which was essentially cut in half by early July when futures traded around \$5.50. Prices then rallied to just over \$7 by late August only to fall back to \$6.30 at January 2, 2007, in the dead of winter. By February 2007, gas prices had recovered to the upper \$7 range as colder weather supported the higher price. If we experience a similar price pattern for natural gas this year and winter, then we could be looking at gas prices in the mid-\$3 range at the turn of the year.

Exhibit 8. Winter 2009-10 Gas Prices Below 2006-07



Source: EIA, PPHB

It will likely be the winter of 2012-13 before natural gas futures prices approach the \$6/Mcf level

The encouraging view is that the historic price pattern suggests we might see late winter demand boosting gas prices closer to \$5.50. As we write this story (August 26th) February 2011 futures prices for natural gas are only \$4.55, or nearly one dollar below where they might be if the 2006-07 winter pricing pattern were to be repeated. Given the highly negative outlook for gas pricing at the present time, it is not surprising that it will likely be the winter of 2012-13 before natural gas futures prices approach the \$6/Mcf level as reflected by the current futures prices. So will the bulls of summer still be disappointed despite their lowered price expectations even though they are now officially bears?

Carbon Footprint And Solar Power – What In The World?

One article focused on the federal government's total fixation on green energy and green jobs to the exclusion of any semblance of economic analysis

In the course of our reading recently we came across two articles that made us wonder what the world is coming to as we grapple with carbon emissions and ways to reduce them. One article focused on the federal government's total fixation on green energy and green jobs to the exclusion of any semblance of economic analysis. (Not a surprise from this administration in our opinion.) The other article dealt with our ultimate contribution to minimizing our carbon footprint – how we treat our dead.

We know the Obama administration has embraced green energy as

Based on those economics, however, the project's payout on this investment will be 70 years

a core principle in its mission while in office. By that we mean it wants to restructure our economy and alter our lifestyles to minimize the use of dirty fossil fuels and replace them with alternative energy sources that are non-polluting (or at least emit minimal amounts of carbon). One aspect of this mission was to award money from the 2009 American Recovery and Reinvestment Act (a.k.a. The Stimulus) for "shovel-ready" green energy projects that would put people to work. One such project, which was recently singled out by Vice President Joe Biden, was putting solar panels on the Ennis National Fish Hatchery in Ennis, Montana. According to reports, the hatchery uses about 34,000 kilowatt-hours (kWh) of power a year, which at \$0.10 per kWh generates an annual electricity bill of \$3,400. The solar panels cost \$179,000 to install and, we are assured, will generate 75% of the hatchery's electricity, thereby saving the government \$2,500 annually. Based on those economics, however, the project's payout on this investment will be 70 years. Since the most recent vintage of solar panels are projected to last for 40 years, leaving the hatchery in the dark and the spawning water cold for at least 30 years. This is an example of the folly of many green energy projects – they wear out long before they payout! That feature of many green energy projects is conveniently ignored while they are being sold to the taxpayers.

The volume of steel buried each year alone is equivalent to rebuilding the Golden Gate Bridge

That led to the second discovery. Possibly the most interesting "clean energy" project we have run across is a new and improved cremation device. About 2.4 million Americans die each year and roughly 70% of them are buried. Funerals create their own carbon footprint issue. Traditional caskets are made from wood, steel and copper and then they are placed in reinforced concrete boxes to prevent the weight of the earth from causing them to collapse. Bodies are also embalmed with toxic chemicals like formaldehyde. Every year cemeteries bury about 30 million board feet of wood, 104,000 tons of steel, 2,700 tons of copper and bronze and 1.6 million tons of reinforced concrete. The volume of steel buried each year alone is equivalent to rebuilding the Golden Gate Bridge.

The process uses 10% of the energy of conventional cremation and releases no toxic emissions

With land availability for cemeteries at a premium, interest in cremation has been growing in recent years. But this process has come under attack from environmentalists for its carbon footprint. According to industry sources, cremation releases about 150 kilograms of CO₂ and around 200 micrograms of mercury (tooth fillings primarily) per body. A new cremation process has been developed in Australia and is now approved in four states (Oregon, Minnesota, Florida and Maine) with California expected to become the fifth. The process, called Aquamation, or alkaline hydrolysis, uses potassium and scalding-hot water in a stainless steel tank for about four hours. The body is essentially dissolved within that time frame. The process uses 10% of the energy of conventional cremation and releases no toxic emissions. The process also allows for the recycling of artificial implants such as hips, knees and pacemakers, so we could see a market for used implants develop, which might cause prices in the medical device industry to decline in the future.

Exhibit 9. A Clean Cremation Lowers Energy Use

A greener way to go

- Traditional cremation releases greenhouse gases, smog-causing gases, mercury, dioxins and furans.
- Resomation emits no toxins or dioxins into the atmosphere and far less carbon dioxide.
- Energy used to cremate the average sized body is roughly equal to driving gasoline-powered vehicle 7,700 kilometres.



SOURCE: Cremation Association of North America, Transition Science Inc.

Ecological comparisons
With resomation, metals and plastics in the body are easily retrieved, including mercury fillings, metal hips and knees, pacemakers.

PER BODY	RESOMATION	CREMATION
CO ₂ emissions (kg)	50	400
Natural gas used (cubic metres)	7	92
Electricity used (Kwh)	9	29

Source: Yourfuneralguy.com

With an aging baby boomer population, is Aquamation something that could impact future U.S. energy demand?

California State Assemblyman Jeff Miller, sponsor of a bill in that state to legalize Aquamation says, "It's green. It's clean. It's environmentally friendly and it reduces the carbon footprint." Of course, Aquamation does cost more - \$1,000 versus the conventional cremation at \$250. As funeral home director Thomas Lynch put it, "Alkaline hydrolysis will separate the environmentally conscious from the environmentally passionate." With an aging baby boomer population, is Aquamation something that could impact future U.S. energy demand?

Energy Conservation And Future Energy Demand

Historically, utilities have experienced demand growth with the annual pace of growth dictated by the health of the economy

The electricity industry is wrestling with how to restructure its business model to account for efforts to convince consumers to reduce their energy use while being paid for promoting this efficiency. Historically, utilities have experienced demand growth with the annual pace of growth dictated by the health of the economy. As a result, the focus of utility company managements has always been on how much generating capacity it needs, when it will need that additional capacity and how the capacity additions can be achieved at the lowest possible cost. The constant need for investment in new generating capacity and the high cost of these additional facilities contributed to the granting of municipal monopolies in return for regulation on profitability.

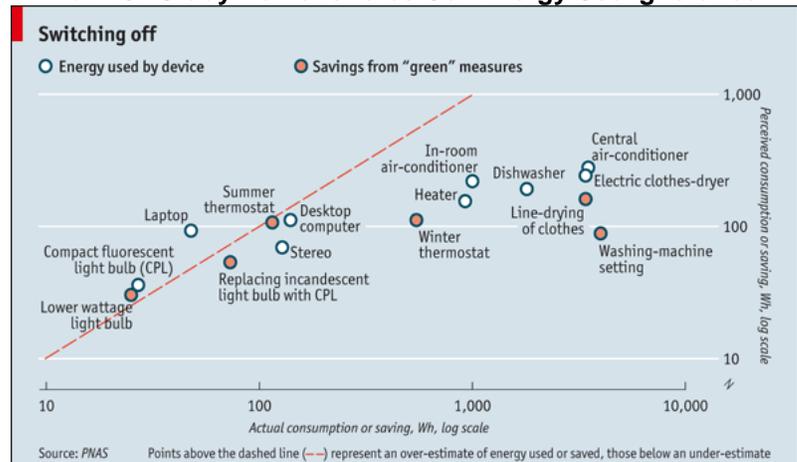
For decades this industry model has worked, and worked well. Now, with the focus shifting to the nation's need to reduce its carbon (and other) emissions, energy conservation has become a prime focus of utility company managements as a way to satisfy the emissions

What the researchers found was that on average, the participants underestimated both energy use and energy savings by a factor of 2.8

goal. If you are successful in convincing customers to use less energy, how is the utility rewarded for selling less of its product? As Jim Rodgers, CEO of Duke Energy (DUK-NYSE) says, the best investment his company can make is the power plant he doesn't have to build to meet growing demand. Not all executives see it the same.

Recently, two studies are casting doubt on how to make electricity conservation work and whether new lighting mandates will actually stimulate rather than reduce electricity demand. One study was performed by Dr. Shahzeen Attari of Columbia University with some colleagues. The results were published in the *Proceedings of the National Academy of Sciences*. They used Craigslist to recruit 505 volunteers from across the United States to estimate the energy consumption of nine household devices as well as predict the energy savings from performing six green actions. What the researchers found was that on average, the participants underestimated both energy use and energy savings by a factor of 2.8. The explanation for this underestimation is that the volunteers undervalued the requirements of large machines such as heaters and clothes dryers. This meant that they failed to recognize the large energy savings that can come from improving the efficiency of these large machines. Participants had a tendency to endorse actions with small savings such as turning off lights, while ignoring large savings from modest changes with large machines. For example, by switching the washing machine setting from "hot" to "warm" a consumer could save 4,000 watt-hours with each load of laundry done.

Exhibit 10. Study Demonstrates Our Energy Use Ignorance



Source: The Economist

Some critics of the study contend that by presenting a measure of energy use for the standard 100-watt light bulb, participants may have responded to questions by anchoring their estimates to this value. Dr. Attari believes this may have happened, but he also believes that this is what the general public does. If you think about it, all the fluorescent light bulb packages show the energy savings as

Since lighting consumes about 6.5% of the world's energy supply, the idea that mandating a switch to solid-state lighting to save on energy and reduce carbon emissions should be an obvious conclusion

a measure of a number of standard light bulbs. To overcome the conclusions of the study and make people more aware of the proper energy-saving actions, more information needs to be presented to people and/or we need to employ devices that constantly monitor household appliances. This conclusion argues for the early adoption of "smart" electric meters.

Offsetting the Columbia University study conclusions are the results from a study conducted by Jeff Tsao of Sandia National Laboratories that was published in the *Journal of Physics D: Applied Physics*. He predicts that the introduction of solid-state lighting, one of the hot new topics for lighting, could actually increase electricity demand. Since lighting consumes about 6.5% of the world's energy supply, the idea that mandating a switch to solid-state lighting to save on energy and reduce carbon emissions should be an obvious conclusion. Mr. Tsao believes that it could actually lead to the opposite result.

Solid-state lighting refers to a type of lighting that uses semiconductor light-emitting diodes (LED), organic light-emitting diodes (OLED), or polymer light-emitting diodes (PLED) as the sources of illumination rather than electrical filaments, plasma or gas such as used in incandescent and fluorescent light bulbs. Compared to incandescent lighting, solid-state lighting creates visible light with reduced heat generation. Most common white LEDs convert blue light from a solid-state device to an approximate white light spectrum using photoluminescence, the same principle used in conventional fluorescent light bulbs.

Exhibit 11. LEDs Are Becoming Popular



Source: Wikipedia

The average Briton uses about 46 megalumen-hours a year, or nearly 100,000 times more than his earlier counterpart

In 1700, a typical Briton consumed 580 lumen-hours (the measure of light perceived by the human eye) per year. At that time, the light came from burning candles, wood and oil. Today, by using electric lights, the average Briton uses about 46 megalumen-hours a year, or nearly 100,000 times more than his earlier counterpart. Improved technology has stimulated demand and, in turn, the consumption of energy.

Mr. Tsao believes this same historical pattern will happen with LEDs and other solid-state lighting. He assumes that by 2030, solid-state lights will be about three times more efficient than fluorescent light

His model predicts that the number of megalumen-hours consumed by the average person will rise tenfold from 20 to 202

bulbs and that the price of electricity stays flat in real terms, so his model predicts that the number of megalumen-hours consumed by the average person will rise tenfold from 20 to 202. The amount of electricity needed to generate that light would more than double. In his model, Mr. Tsao determined that only if the price of electricity triples would the amount consumed start to fall by 2030.

So maybe the answer to energy consumption is not to brighten the world but to dim it

In an interesting twist, when gas lights replaced candles and oil lamps in England, the criticism was that they were “glaring” or “dazzling white.” The reality is that these gas lamps gave off about as much light as a 25-watt incandescent light bulb. Today, our eyes would say that amount of light would be dim. So maybe the answer to energy consumption is not to brighten the world but to dim it. That would argue we should cancel the programs to ban incandescent light bulbs if we really want to save energy. What a radical thought!

A Fuel Smorgasbord For Electricity In Rhode Island

First was how many different fuel sources there were

We recently received a flyer in our monthly electric bill for our home in Rhode Island. The flyer contained a page outlining electricity facts for customers of National Grid (NGG-NYSE) in the state. One table listed the fuel sources the utility utilized to produce electricity in 2009 and their relative importance to the mix. We had three observations about the information contained in the table, which has been reproduced below. First was how many different fuel sources there were. Second was the significance of various categories of fuel supplies. And lastly was that Imported Power is considered a fuel source. That last classification reminded us of the California politician who was adamant that his state didn't need to encourage the development of more oil and gas supplies because they had electricity. The incompetence that citizens tolerate in their elected officials is always amazing!

Exhibit 12. Gas And Nuclear Largest Fuel Suppliers

Power Source	Resource Mix
Biomass	0.1%
Coal	10.1%
Diesel	1.3%
Digester Gas	0.0%
Efficient Resource (Maine)	0.0%
Fuel Cell	0.0%
Hydroelectric/Hydropower	4.6%
Jet	2.6%
Landfill Gas	1.0%
Municipal Solid Waste	0.1%
Natural Gas	35.0%
Nuclear	30.0%
Oil	1.5%
Solar Photovoltaic	0.0%
Imported Power	11.7%
Trash-to-Energy	0.7%
Wind	0.0%
Wood	1.3%
	100.0%

Source: National Grid

We were surprised to see that wood continues to supply an appreciable amount of fuel

We were surprised to see that wood continues to supply an appreciable amount of fuel. We suspect the category is really wood chips being used as an alternative power source. Interestingly, wood was the primary source of energy in the United States for two centuries or more before coal assumed that mantle. We were also somewhat surprised to see that petroleum fuels accounts for 2.8% of the state's electricity.

It will also be interesting to see when, and how much, electricity shows up in the wind and solar photovoltaic categories in the future

Amazingly natural gas has the largest share of electricity's fuel with nuclear power close behind. We are not sure what Jet represents. Is it jet turbines at peak power plants? If so, the issue should be not how the electricity is made but what fuel powers the jet engine. The same semantic issue exists with Imported Power. That may be a category of electricity but it does not tell us what fuel generated that power. Maybe National Grid can't determine the fuel source, which is similar to clean energy since no one can identify which electrons are generated by wind and solar power versus those coming from coal- or gas-fired power plants or even nuclear power plants.

We must admit that we are not sure what certain fuel supply categories are such as Efficient Resource (Maine). We assume it relates to an alternative energy project in Maine that National Grid is programmed to buy power from. Digester Gas was another process we were not familiar with. It turns out to be the use of methane gas produced by wastewater treatment plants that fuels an internal combustion engine running a generator producing electricity. It will also be interesting to see when, and how much, electricity shows up in the wind and solar photovoltaic categories in the future. Reading this list reminded us that it represents what our nation's energy program should be: Develop all our fuel resources.

Focus Shifts From GOM Spill To Future of Industry

Almost every witness has legal counsel that has shifted the hearings into more finger-pointing and legal posturing than fact-discovery sessions

The latest round of fact-finding questioning about the cause of the Deepwater Horizon accident and resulting BP oil spill was conducted in a hotel near Hobby Airport in Houston last week. The hearings were run by a joint panel of U.S. Coast Guard and Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE), formerly the Minerals Management Service (MMS) officials. The panel called several BP, Transocean and Halliburton (BP-NYSE, RIG-NYSE, and HAL-NYSE) managers as witnesses to explain events at the time of the accident. A couple of other key witnesses have either invoked their Fifth Amendment rights against self-incrimination or been advised by their medical doctors not to appear. By now, almost every witness has legal counsel that has shifted the hearings into more finger-pointing and legal posturing than fact-discovery sessions.

Since the leaking Macondo well was capped by BP on July 15th, no additional oil has spilled into the Gulf. As a result, the national media has begun to tire of the spill coverage. Without any significant developments that produce moving video images,

This BOP is the equivalent of the “murder weapon” in TV police dramas, only the condition of the device will be the critical issue and not what fingerprints are on it

activities such as drilling relief wells and cleaning oil from the water and tar balls from beaches becoming boring. Now, the media will shift its attention to the various debates and disputes over the accident, the clean-up effort and the punishment of the oil industry. They will likely be asking questions such as: How much oil was actually spilled and where did it all go? Who or what caused the accident? What’s the future of the offshore industry in the Gulf of Mexico? Will President Obama stop coming to the Gulf Coast?

The most significant upcoming event will be the switching out of the Macondo well’s blow-out preventer (BOP) - the failed last resort defense against the uncontrolled flow of hydrocarbons from a well being drilled. This BOP is the equivalent of the “murder weapon” in TV police dramas, only the condition of the device will be the critical issue and not what fingerprints are on it. There is speculation that the BOP will show too much wear-and-tear to conclusively establish what happened to prevent it from closing and sealing off the oil and gas flow. That is one reason why so much of the hearing’s questioning has been directed at the repair history of the BOP. What we are confident about is that every lawyer engaged in this case will want to examine it along with his “BOP expert.” The scene will resemble hospital rooms as doctors do their rounds with a gaggle of interns in tow.

That removal process is being hampered by the inspection of the BOP that shows three sections of pipe stuck inside the unit. There was also an issue with hydrate crystals that had formed in the upper section and needed to be removed. The three pipe sections vary in size: one foot, 13 feet, and the longest being approximately 3,000 feet in length. Attempts are being made to remove them before swapping out the BOP. BP is confident it can remove the two smaller pipe sections, but if not, then a mechanism for removing the BOP with the pipe still attached will need to be developed.

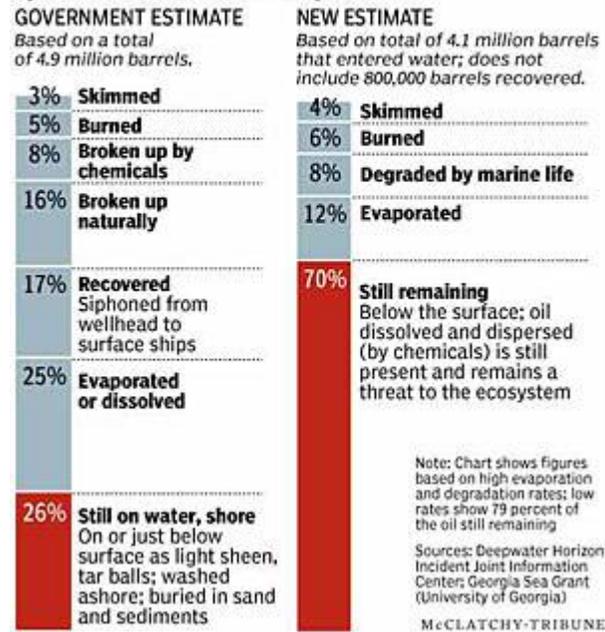
These issues are the environmental impact of the oil spill on the Gulf of Mexico ecosystem and the Gulf Coast economy, and the shape of regulatory modifications to be imposed on the offshore energy industry and their impact on future offshore activity and the nation’s supply of oil and gas

To us the most important question for debate is the future of the industry, and that means two major issues need to be examined. These issues are the environmental impact of the oil spill on the Gulf of Mexico ecosystem and the Gulf Coast economy, and the shape of regulatory modifications to be imposed on the offshore energy industry and their impact on future offshore activity and the nation’s supply of oil and gas. Of these two issues, the environmental impact question has taken center stage. In fact, it has turned into a spectacle as the federal government’s chief offshore environmental organization, the National Oceanic and Atmospheric Administration (NOAA), is being challenged by academic environmental experts over a report NOAA issued about the oil spilled. The debate has become increasingly contentious as the academic world sees the spill as a research opportunity with potentially huge dollars attached. If we do not know how best to measure the volume of oil spilled and what the long-term impact of this oil may be on the ocean’s ecosystems and indirectly on our food supply, then government research spending to address these issues will need to be increased. As a result of this economic opportunity, each official

(NOAA) pronouncement about the amount of oil spilled by the Macondo well and the potential environmental damage was challenged by the academics.

**Exhibit 13. Battling Environmental Reports
HOW MUCH OIL IS IN THE GULF?**

A new report says much more oil from the BP spill remains in the water than what federal officials reported. How the estimates compare:



Source: The Houston Chronicle

The NOAA report claimed that nearly 74% of the oil spilled has been skimmed, burned, recovered, broken up, evaporated or dissolved leaving only 26% still on the water or onshore

If that plume were a rectangular solid it would hold about 3.6 trillion gallons

The latest criticism of NOAA's efforts was over its recent report, the conclusions of which were hailed by Carol Browner, environmental advisor to President Obama, and the president himself, about what happened to all the oil spilled from the Deepwater Horizon accident. The NOAA report claimed that nearly 74% of the oil spilled (estimated at 4.9 million barrels but clearly that is an estimate open to debate) has been skimmed, burned, recovered, broken up, evaporated or dissolved leaving only 26% still on the water or onshore. This analysis has been challenged by teams of scientists from the University of Georgia and the Woods Hole Oceanographic Institution who contend that 70% of the oil still remains in the water, with a substantial portion of it below the surface in a large plume such as the one illustrated in the visual below.

According to the Woods Hole study, the underwater oil plume, discovered in June, is 22 miles long, 1.2 miles wide and 650 feet high. If that plume were a rectangular solid it would hold about 3.6 trillion gallons according to an analysis by Geoffrey Styles of GSW Strategy Group, LLC. He highlights two key points in the debate that make the differences between NOAA's and the academics' conclusions less contentious than they are. First, he says people are misreading the NOAA estimates. Their critics are basing their

Exhibit 14. Schematic Of Subsea Oil Plume

Source: Woods Hole Oceanographic Institution

Some portion of this 25% of the oil, along with the volume “Broken up by chemicals” (8%) and “Broken up naturally” (16%), or possibly as much as 49% of the oil spilled, is still in the water

He calculates that the total volume of the oil in the plume is about 200,000 gallons or under 5,000 barrels of oil

attacks on the small percentage of oil still assumed to be in the water, but NOAA never made clear whether they believe all the oil made it to the surface. As a result, if one looks at the NOAA categories some 25% is actually known to have been removed – the oil skimmed (3%), burned (5%) and recovered (17%). Oil that is likely no longer in the water is some portion of the category “Evaporated or dissolved,” which is estimated at 25%. Only the portion that actually reached the surface and evaporated (the oil was light) is actually gone. Some portion of this 25% of the oil, along with the volume “Broken up by chemicals” (8%) and “Broken up naturally” (16%), or possibly as much as 49% of the oil spilled, is still in the water. That portion should be added to the 26% “Still on water, shore” meaning as much as 75% of the oil may still be in the water. That is essentially what the scientists say (70% remaining) in their analysis. So maybe this great debate is semantic more than real.

When it comes to the oil plumes, there is also an issue with the reporting of its existence by the media. Nowhere has the media reported the plume’s oil concentration. Mr. Styles points out that Woods Hole reports that the concentration of specific oil-derived molecules is “in excess of 50 micrograms per liter.” Adjusting the measurement for the density of the chemicals studied, Mr. Styles says this means that the scientists found oil-related concentrations of 57 parts per billion by volume. He calculates that the total volume of the oil in the plume is about 200,000 gallons or under 5,000 barrels of oil. While Woods Hole hints that there is more oil in the plume, but without more proof, it amounts to less than 0.1% of the estimated 4.9 million barrels spilled. This volume certainly doesn’t cast serious doubt on NOAA’s assessment of where all the oil went. What we don’t know is whether this amount of oil creates a serious problem for the aquatic population and our seafood supplies.

New reports are citing data showing that microbes have digested most of the oil in the underwater plume. As a result, there is a

What a great opportunity in the face of academic budget cuts by the federal and state governments

feeling that the oil in the water debate will soon be a non-issue. The debate, however, will still put pressure on Congress to allocate more money to the study of the Gulf of Mexico eco-system, which will keep a large number of scientists employed for the foreseeable future. What a great opportunity in the face of academic budget cuts by the federal and state governments.

Secretary of the Interior Kenneth Salazar, in an op-ed piece in *The Houston Chronicle*, says that the administration's goal is "to raise the bar on safety and environmental protections so that deepwater drilling can safely resume"

The future of the offshore industry in the Gulf of Mexico is equally cloudy. The deepwater drilling moratorium remains in place even though Michael Bromwich, head of the BOEMRE, says in a letter to the presidential commission investigating the causes of the Deepwater Horizon accident and BP oil spill that he holds out hope certain classes of rigs may be exempted from the ban before its estimated expiration date of November 30th. Secretary of the Interior Kenneth Salazar, in an op-ed piece in *The Houston Chronicle*, says that the administration's goal is "to raise the bar on safety and environmental protections so that deepwater drilling can safely resume." Since the deepwater drilling moratorium was put into effect through the regulatory process, there is nothing saying that when November 30th arrives another ban won't be instituted, or that permit granting becomes so onerous that the oil industry might as well be under another moratorium. That risk comes amidst the recent release of documents showing that the Obama administration knew there would be as many as 23,000 energy-related jobs lost from the offshore drilling ban, but elected to go forward with it anyway. Since members of the presidential commission are supposed to come up with not only an analysis of what caused the Deepwater Horizon accident but also what changes in regulation should be made to prevent it from happening again, one has to wonder how Mr. Bromwich can say that certain rigs may be allowed to go back to work early. Importantly, the commission is not due to report its findings until mid January 2011, nearly 45 days after the supposed expiration date of the drilling ban.

Unfortunately, falling oil and natural gas prices don't help the cause for resuming drilling

In recent days the Obama administration has come under increased political pressure to ease the deepwater drilling ban. The regulators are all hinting at a possible early termination. But with the media slowly pulling away from coverage of the oil spill's after-effects, we wonder just how strong the protest of a small number of Gulf Coast residents can be in swaying the administration. Unfortunately, falling oil and natural gas prices don't help the cause for resuming drilling.

Remember that the author of the op-ed is the same official who restricted onshore drilling earlier this year and Arctic drilling

A reading of Sec. Salazar's op-ed reveals the negative attitude held by the Obama administration towards the oil and gas industry. Remember that the author of the op-ed is the same official who restricted onshore drilling earlier this year and Arctic drilling. In its first three sentences, Sec. Salazar chastises the oil and gas industry for its "race to drill deeper, faster and farther out for resources and profits." He then says that the Deepwater Horizon accident with 11 deaths and 4.9 million barrels of oil spilled showed that "some operators were taking too many gambles in the deep waters of the Gulf of Mexico." The third sentence says it all. "Those days of big risks are over." The problem with this attack on the entire industry is

He conveniently ignores the outstanding safety record of the industry over this period and the contribution the offshore oil and gas industry has made to stopping and reversing America's declining oil production

that it ignores the fact that the companies that caused the accident and spill will be paying for it both financially and in reputation.

At the end of the op-ed, in commenting on the shallow water drilling market, Sec. Salazar says that "drillers can continue drilling if they meet the new standards and play by the rules." He further acknowledges that both the deepwater drilling moratorium and the reforms being implemented have been attacked by "the same powerful interests who have, over the last two decades, systematically fought regulation and oversight of offshore drilling operations." He conveniently ignores the outstanding safety record of the industry over this period and the contribution the offshore oil and gas industry has made to stopping and reversing America's declining oil production, which has helped ameliorate our balance of trade position.

This approach goes against the methodology of regulation by the Federal Aviation Administration that doesn't ground all planes of a particular type when one has an accident

With roughly 90 days to go before the deepwater drilling moratorium is due to end, we still have little idea how offshore drilling regulations will change. In light of that uncertainty, we found it curious that Mr. Bromwich dismisses a rig-by-rig approach for release from the moratorium to a class of rigs at a time policy. He said in his letter, "We believe that this approach – rather than focusing on rig-by-rig inspections performed against the backdrop of shifting regulatory requirements - is a more coherent approach to improving the level of safety in deepwater." This approach goes against the methodology of regulation by the Federal Aviation Administration that doesn't ground all planes of a particular type when one has an accident. Moreover, when they ascertain the cause of the crash, orders are given to inspect the targeted part or system of each plane within that model. Each plane is removed from service at the airline's discretion but within the specified inspection time period and once cleared or repaired is then allowed to fly again.

Rational and consistent government policy has not been a strong suit of this administration

Maybe the fact airlines don't make much profit is the key determinant in how companies "play by the rules." Of course, without the profits of the oil and gas and oilfield service companies, the Obama administration would be in a worse budget deficit position. Rational and consistent government policy has not been a strong suit of this administration. Driving our economy toward an untenable green-energy footing may appear popular with certain segments of the electorate, but without an understanding of the consequences of this strategy it is reckless and harmful. Hopefully someone will come to his senses before it's too late.

Energy Industry Dealing With Legal Immigration Issues

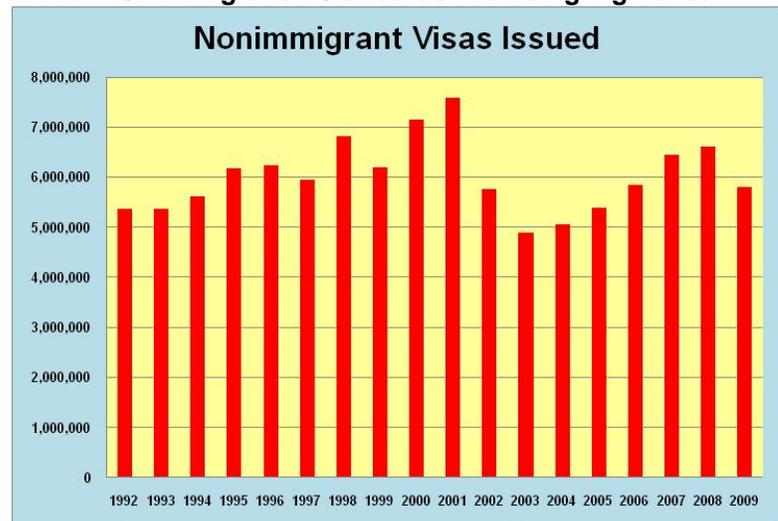
The legal battle being waged between the federal government and the State of Arizona over that state's recently enacted immigration legislation has received all the headlines while at the same time the energy industry struggles to operate in the face of growing legal immigration issues. Demographic changes underway in the global energy industry are running headlong into tighter restrictions on the

Additionally, the oilfield service industry has to train increasing numbers of foreign nationals to staff growing operations in foreign lands

granting of non-immigrant visas to travel to and work in the United States. This clash may prove to be as fatal for the local energy business over time as heart disease - the vaunted “silent killer” of Americans – is for humans. For people who don’t know, heart disease, more particularly coronary heart disease (CHD), is the number one killer of both American men and women surpassing deaths from HIV, cancer and lung disease. But what does CHD have to do with the oil and gas industry?

Increasingly the oil and gas and oilfield service industries are employing foreign nationals – either recent graduates from U.S. petroleum schools and from foreign universities or skilled field workers from around the world. Additionally, the oilfield service industry has to train increasing numbers of foreign nationals to staff growing operations in foreign lands. The pressure to hire more foreign nationals is coming from both foreign government dictates for increased local content to be met through increased employment of the country’s nationals and through just normal corporate staffing needs partially driven by aging work forces and retirements. These pressures are increasing at the exact time the U.S. government has become more restrictive in granting visas for nonimmigrants seeking to come to our country.

Exhibit 15. Immigration Standards Are Being Tightened



Source: Department of Homeland Security

We understand, the British Embassy has engaged in collecting data and antidotes about problems securing visas

After falling in the two years immediately following the 9/11 attack and in response to our nation’s effort to tighten our borders, visas granted to non-immigrants began to increase. From fiscal 2003 through fiscal 2008, the number of visas granted increased each year until fiscal 2009. Recently, we understand, the British Embassy has engaged in collecting data and antidotes about problems securing visas and dealing with immigration issues for British companies operating in the United States. They plan to use the data to argue for improvements in our immigration process for British nationals.

Exhibit 16. May Data Shows Fewer Visas Approved

	May-10	May-09	% Change
Received	471,172	350,999	34%
Approved	400,210	420,673	-5%

Source: USCIS

The report also shows that the number of visa applications approved declined 18% this year from last

The most recent figures for immigrants applying for visas as reported by the United States Citizenship and Immigration Service show that while applications in May were up 34%, the number approved declined 5% from a year ago. The data also shows that for the eight-month, year-to-date period in fiscal 2010, visa applications received were 9% lower than in the comparable time period of FY2009. The report also shows that the number of visa applications approved declined 18% this year from last. This trend was confirmed based on a discussion with a Houston-based immigration lawyer.

Exhibit 17. Data Shows Fewer Applications And Approvals

	FY 2010 to Date	FY2009 to Date	% Change	FY2009
Received	3,234,736	3,547,347	-9%	4,510,694
Approved	3,113,766	3,792,716	-18%	5,069,167

Source: USCIS

Immigration issues have created problems for companies wanting to bring foreign nationals to the U.S. for training sessions

For the energy industry, the growing population of foreign national employees is creating hassles for human resource departments as immigration policies and restrictions can make employment duty-tours in the United States difficult to implement. This has become a significant problem for oil and gas company research and development efforts as foreign nationals are making up an increasingly large number of new science and technology graduates every year. Immigration issues have created problems for companies wanting to bring foreign nationals to the U.S. for training sessions. The answer has become clear for oilfield service companies. Increasingly they are opting to build new training centers in overseas locations. Will oil and gas company R&D centers also move abroad? We suspect so, although that doesn't mean they will shut down their current R&D centers.

By moving R&D and training centers abroad, the companies can overcome potential problems if they are to be staffed with foreign nationals

Reportedly 13 million additional Americans a year are inflicted with CHD and don't know it. Likewise, the oil and gas industry in the United States increasingly has to deal with integrating foreign nationals into their work force while not knowing what future immigration problems they may encounter. By moving R&D and training centers abroad, the companies can overcome potential problems if they are to be staffed with foreign nationals. Eventually, as more foreign nationals rise to the upper ranks in management, the view of where best to locate staff and even corporate headquarters will likely change. The allegiance to the United States through cultural and historical ties will become less strong. Add to that the immigration issue, prospects for higher health costs, more

The scenario we envision suggests that some other city in the world may replace Houston as the center of the international oil and gas industry

government regulation, and having to operate under the only global corporate income taxing structure in the world, decisions about relocating outside of the U.S. will become much easier to make.

From a purely local (Houston) perspective, the prospect of the above scenario unfolding is not a pleasant thought. For many career oil and gas and oilfield service executives in international companies, they could count on multiple tours of duty in Houston during their career development. The transient nature of oil industry employees contributed to Houston evolving into a very “welcoming” community. The scenario we envision suggests that some other city in the world may replace Houston as the center of the international oil and gas industry. How quickly the scenario unfolds is difficult to predict, but upcoming tax and regulatory changes either later this year or next will help determine that timing. With potential corporate moves, Houston, and the United States, will lose high-tech and high-paying jobs. Houston has survived several deep oil and gas industry recessions through diversifying its economy. Hopefully, Houston will be able to do it again.

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