PPHB

ENERGY INVESTMENT BANKING

MUSINGS FROM THE OIL PATCH

April 2, 2013

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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

The Fantasy World Of Academics And Energy Development

The thrust of the article was to show that we don't need Canada's oil

A news-as-opinion column in *The New York Times* recently asked the question: "To what extent will we really 'need' fossil fuel in the years to come?" That question was followed by another asking: "To what extent is it a choice?" The article had led off with a quote from a television commercial promoting the approval of the Keystone XL pipeline, designed to haul Canadian oil sands bitumen to the U.S. Gulf Coast. The thrust of the article was to show that we don't need Canada's oil. The author of the article, Elisabeth Rosenthal, a reporter on environmental and health issues for the paper, went on to discuss how renewables are gaining greater market share in various countries around the world and the U.S. is lagging behind. She examines two studies demonstrating how the U.S. could reduce consumption of fossil fuels. One study referenced was from the National Research Council that projected that the United States by 2030 could cut in half the amount of oil it uses in cars and trucks compared with 2005 levels. That accomplishment would come from improving the efficiency of gasoline-powered vehicles and by relying more on cars powered by alternative sources such as electric batteries and biofuels. The other study cited was from a team of Stanford University engineers with help from Cornell University professors that showed how New York State could produce all the power it needs from wind, solar and water power by 2030. The researchers suggest that there is so much potential power in New York State from these alternative sources that the state could also power all the vehicles operating now and in the future.

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According to Dr. Mark Z. Jacobson, a professor of civil and environmental engineering at Stanford University and the lead author of the study published in the journal *Energy Policy*, "It's absolutely not true that we need natural gas, coal or oil – we think it's a myth. You could power America with renewables from a

technical and economic standpoint. The biggest obstacles are social and political – what you need is the will to do it." According to these researchers, New York State needs to be Nike and just do it!

So what will it take for New York State to become essentially completely powered by wind, water and sunlight (WWS)? It will take a lot in our view, but obviously not a lot in the view of the professors. According to the researchers' model, New York State will only need the following new facilities:

4,020 onshore 5-megawatt wind turbines
12,770 offshore 5-megawatt wind turbines
387 100-megawatt concentrated solar power plants
828 50-megawatt photovoltaic power plants
5 million 5-kilowatt residential rooftop photovoltaic systems
500,000 100-kilowatt commercial/government rooftop PVS
36 100-megawatt geothermal plants
1,910 0.75-megawatt wave devices
2,600 1-megawatt tidal turbines
7 1,300-megawatt hydroelectric power plants, most exist

Those savings alone would pay for the new power infrastructure needed within about 17 years

Assuming New York State implemented this program, air pollution-related deaths would decline by about 4,000 annually and the state would save about $33 billion, or 3% of the state's gross domestic product, in health costs every year. Those savings alone would pay for the new power infrastructure needed within about 17 years, or only 10 years if annual electricity sales are included. The plan is set out in a 15-page report with extensive tables and supported by 106 citations of expert reports, government reports and articles. Nearly 20% of the citations are to previous reports authored by this report's lead authors.

The report's conclusions sound wonderful, but are they anywhere close to presenting a realistic outcome? The report's conclusions rest on certain assumptions not prominently displayed that could undercut the plan's success. One issue the authors addressed at the beginning was why the various technologies were selected and not certain other ones. The two technologies not selected were natural gas and liquid biofuels – currently two of the more popular "bridge fuels" to the utopia of a carbon-free energy world.

"Natural gas for electric power results in at least 60-80 times more carbon-equivalent emissions and air pollution mortality per unit [of] electric power generated than does wind energy over a 100-year time frame."

Natural gas was eliminated from consideration for several reasons. As the authors say, "natural gas for electric power results in at least 60-80 times more carbon-equivalent emissions and air pollution mortality per unit [of] electric power generated than does wind energy over a 100-year time frame." Additionally they said, natural gas was eliminated because of its "higher methane emissions and less sulfur dioxide emission per unit [of] energy than coal." So natural gas fails to attain bridge-fuel status because of its pollution and adverse social costs. But maybe the more telling reason it was eliminated was due to the following statement: "Rather than use

natural gas in the short term, we propose to move to a WWS-power system immediately, on a worldwide scale, because the Arctic sea ice may disappear in 20-30 years unless global warming is abated." For those of us who follow that debate, we know that the amount of Arctic sea ice each year is a function of where we are within the very long cycle of expanding and contracting volumes of sea ice. History has charted this expansion and contraction long before carbon emissions in the atmosphere rose to current levels, so it has been hard for scientists to tie pollution to changes in the volume of ice. Because loveable polar bears populate the sea ice and selective photos can make it appear that they are suffering due to the current low sea ice, popular sympathy can be generated for taking actions that supposedly will help them.

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The exclusion of liquid biofuels was directly due to their pollution and lack of energy efficiency. The study's authors write: "In addition to [liquid biofuels] creating more air pollution than gasoline for transportation, their tank-to-wheel efficiency of combustion is 1/4th to 1/5th the plug-to—wheel efficiency of electricity for transportation." The authors cite the positive contribution of liquid biofuels in removing carbon dioxide from the air during photosynthetic growth, but they acknowledge that these fuels require extensive energy to grow, be processed and be transported to end-use locations. The study does allow for the temporary use of solid biofuels (wood pellets, energy crops grown on unused farmland and agricultural waste) and biogas from landfills, but their use will be phased out by 2030-2050.

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The models used in the study determine the impact of the WWS power strategy on the world, the United States and New York State. The study estimates that based on the current trajectory for fossil fuel growth, end-use power demand will increase to 17 trillion watts (TW) by 2030. U.S. power demand will grow to 3 TW while New York State demand will increase to 96 gigawatts. They then compared the growth in conventional fossil fuel and wood use between 2010 and 2030 given no change in energy-use policy and compare that to what energy use would be in 2030 if everyone switched immediately to a WWS policy. The WWS strategy would reduce world, U.S. and New York State end-use power demand and the power required to meet that demand by 32%, 37% and 37%, respectively. The reduction of power needs by sector in New York State would be: residential, -21.0%; commercial, -12.3%; industrial, -20.0%; and transportation, -69.5%. The authors claim that about 15%-25% of those reductions would be caused by "modest" energy-conservation measures. The primary cause of the energy use reductions is the elimination of the need for upstream coal, oil and gas extraction and the processing of fuels such as petroleum and uranium. An interesting assumption in the study's model is that population growth for New York State will be very small. Between 2010 and 2030, the U.S. population is expected to increase by 16.4% while New York State increases by only 2.15%. If this energy

The WWS strategy would reduce world, U.S. and New York State end-use power demand and the power required to meet that demand by 32%, 37% and 37%, respectively

policy switch is implemented we would not be surprised if New York State's population actually shrank as citizens leave for (no pun intended) greener pastures.

We found certain assumptions regarding the fuels selected interesting. For example, the authors discuss positively that New York State possess "abundant" geothermal resources and that its development requires little land area, yet they foresee it only accounting for 5% of total power demand in 2030. On the other hand, offshore wind, acknowledged to be among the most expensive alternative energy sources available, is being relied upon to supply 40% of the state's power demand. Rooftop solar power is projected to generate 12% of power demand from almost five million installations. The 828 commercial solar power plants should contribute 10% of future power demand. In that regard, the study says that utility-scale solar power costs are in the range of 11.1-15.9 cents per kilowatt-hour (kWh). They project the cost will fall to 5.5 cents per kWh in 2020-2030. It was interesting that last Thursday, on CNBC's morning show, the CEO of Wisconsin Energy (WEC-NYSE) was discussing his power costs to the amazement of the hosts. When asked about solar power, he said that a few years ago, the fully-loaded cost of a solar power plant was about 22 cents per kWh. He said a new solar power plant would cost about 9 cents per kWh. The hosts were ecstatic until they asked him about a new natural gas-powered plant. He answered it would cost 4 cents per kWh and suggested that solar power costs and technology still have a long way to go to compete with conventional fossil fuels such as natural gas.

Offshore wind, acknowledged to be among the most expensive alternative energy sources available, is being relied upon to supply 40% of the state's power demand

Another aspect of the WWS study is the assumption that there will be a 19-37% increase in the cost of natural gas between 2010 and 2030 and a 109% increase in the cost of gasoline. The WWS strategy is presented as a way for New York State to protect itself against fossil fuel price volatility. Another advantage of a switch to a WWS strategy is that it would not inflict a social cost from the installation of the alternative power facilities. The authors pointed out that the additional footprint on land for WWS facilities is the equivalent of 1% of the state's land. With the additional spacing needed for on-land wind facilities, there would be another nearly 1.5% of the state's land needed, but the authors suggest this land could be used for multiple purposes such as agriculture, animal grazing or park land. They see the solution to this additional land use requirement being to move more facilities to the ocean, lakes and rooftops.

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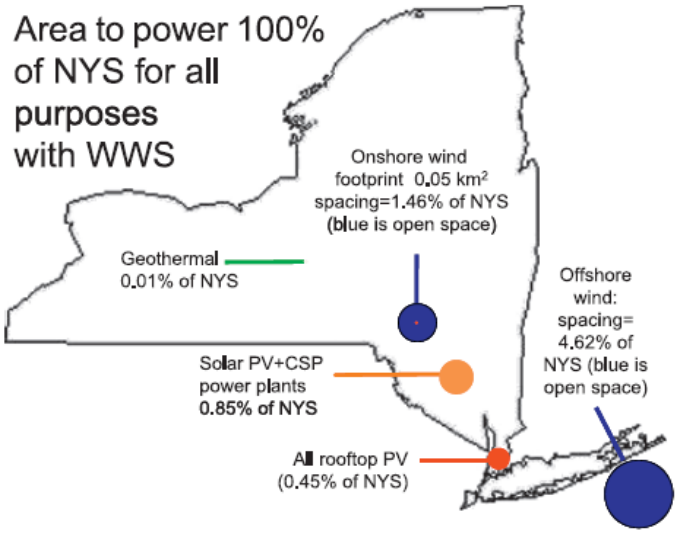
Other aspects of the WWS strategy are relying on battery-electric and hydrogen fuel cell powered passenger vehicle, buses, trucks and locomotives for transportation along with increased use of mass transit and telecommunicating. Of course we still have substantial technical work to develop commercial hydrogen fuel cell powered vehicles. Batteries also play a role in how the authors envision

Exhibit 1. Plan Would Use Very Little NYS Land



Source: ***Energy Policy***

dealing with the variability of many of the WWS technologies. Their strategy to overcome intermittent WWS power is to geographically-disperse WWS resources that are bundled into a set of resources rather than as separate resources and to fill in the gaps with hydroelectric power. They also believe that demand-response (variable pricing) electric grid management will enable shifting demand to better match supply as one answer, but storing energy in thermal storage media or batteries is certainly another way to manage supply and demand. Additionally, they believe that by integrating weather forecasts into system operations it will enable reductions in the reserve requirements the power grid needs to maintain. Lastly, they believe that by over-sizing WWS peak power generating facilities, operators will be able to have spare power available when it is needed and cannot be generated. This strategy would seem to fly in the face of the prior recommendation about weather forecasts in order to reduce reserve requirements. These strategies lead us to ask a few questions: Did the authors consult with CEO Marissa Mayer of Yahoo (YHOO-Nasdaq) who recently reversed her company's long-standing policy allowing employees to work remotely? How about reporting on any discussions with the heads of Boeing (BA-NYSE) or Mitsubishi (MSBHY-OTC) about their latest lithium-ion battery problems with the 787 Dreamliner and the latest electric car targeted for export to the U.S. market? And just who will be responsible for power black-outs when weather forecasts prove wrong – the politicians who relied on the academics, the academics for designing a flawed policy, or the power plant owners? We think we know the answers to these questions.

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The study acknowledges that there will be a serious cost element in the short-term for citizens who must purchase new vehicles to

The authors believe the cost savings from reducing the projected power costs in 2030 under an energy-supply status quo scenario from 17.8-20.7 cents per kWh to 5-11 cents with a WWS strategy is well worth the economic pain

operate in the new energy world. In the end, the authors believe the cost savings from reducing the projected power costs in 2030 under an energy-supply status quo scenario from 17.8-20.7 cents per kWh to 5-11 cents with a WWS strategy is well worth the economic pain. The status quo cost does include the authors' estimate of externality costs from a fossil fuel powered economy (social and economic costs from increased carbon pollution) that would account for one-third to one-quarter of total projected power costs. Since we have yet to see in the real world any cost reductions from alternative energy power supplies, we wonder just how good the model's projection really is.

It sees the creation of 4.5 million construction jobs and 58,000 permanent jobs

The plan is praised for its economic contributions, besides the social gains from reduced carbon emissions. It sees the creation of 4.5 million construction jobs and 58,000 permanent jobs. (We don't see that these estimates are net of jobs lost from the conventional energy businesses.) The total earnings in the form of wages, local revenue and local supply-chain impacts are estimated at $314 billion during construction and $5.1 billion during the operation of the facilities. The total employment cost during construction is equal to one-third of New York State's annual GDP. The annual employment cost suggests the permanent jobs created will have an average annual price tag of $85,000 per job. We believe that implementing this plan would ultimately cost the New York State economy more than 58,000 jobs from existing energy businesses.

We welcome the economic, energy and social policy experiments being undertaken by or proposed for California and New York State, but don't ask us to bail you out if they fail

We understand that the authors are working on WWS strategy plans for other states. Rather than that, we suggest they should devote all their effort to convincing New Yorkers to embrace this plan. We have long been a follower of the nation's founders' belief that the states should be experimental labs for testing social and economic policies in this country, which, when proven successful, will be embraced by the balance of the nation. We welcome the economic, energy and social policy experiments being undertaken by or proposed for California and New York State, but don't ask us to bail you out if they fail. Just think about how much money Las Vegas and Nevada (both of whom need it) will make by creating odds on the success of these states' strategies – and how much money and economic and social harm that may be avoided should they fail.

Understanding Certain Dynamics About The Natural Gas Market

In the past two weeks, natural gas futures prices have crept over the $4 per thousand cubic feet (Mcf) threshold as colder than normal winter weather

One of the great mysteries of the past several years has been why natural gas production has continued to increase (until very recently) despite a dramatic decline in the number of drilling rigs targeting dry gas prospects . In the past two weeks, natural gas futures prices have crept over the $4 per thousand cubic feet (Mcf) threshold as colder than normal winter weather and prospects for continued colder weather has caused a sharp drawdown in natural gas storage volumes and boosted basic demand. Some recent analysis by the

Energy Information Administration (EIA) shed some light on the supply growth mystery.

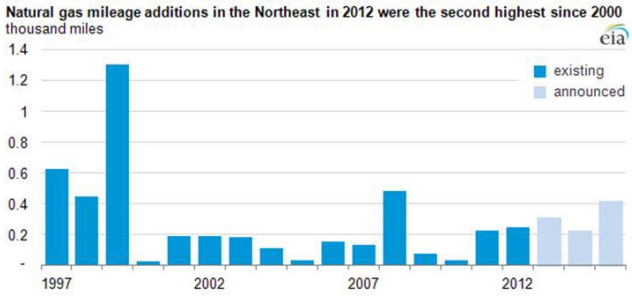
The annual rate of natural gas production in Pennsylvania, has climbed dramatically the past two years

The EIA prepared several charts on natural gas production and gas well drilling in Pennsylvania based on that state's Department of Environmental Protection (DEP) information and the EIA's own data. Exhibit 5 (page 9) shows the history of natural gas well starts commencing in 2005 and the well start data split between horizontal and vertical wells since 2008. Plotted in green diamonds in the chart is the annual rate of natural gas production in Pennsylvania, which has climbed dramatically the past two years. The key to the mystery of why gas production has continued to grow despite a sharp decline in natural gas drilling activity as measured by the fall in the rig count is attributable, with respect to Pennsylvania, to two factors – completion of previously drilled but uncompleted wells and new pipelines allowing increased gas takeaway volumes.

In 2012 there were 367 miles of new gas pipelines placed into service nationwide with 245 miles of them in the Northeast

The additional pipeline capacity may be the more significant factor for Pennsylvania. Drilled but uncompleted wells may be a more important consideration elsewhere, although this measure is much more difficult to track. Our reasoning for this conclusion is other data recently released by the EIA. The EIA released data for miles of pipelines constructed last year and the amount of additional pipeline capacity added, excluding infield gathering and flow lines. According to the data, in 2012 there were 367 miles of new gas pipelines placed into service nationwide with 245 miles of them in the Northeast. Total capacity additions nationwide were 4.5 billion cubic feet per day (Bcf/d), the lowest amount added in the past 15 years. Of the national total, 3.2 Bcf/d of capacity was added to the Northeast grid, the second highest level of additions since 1997. There were two major gas pipelines constructed and placed into service last year – the Appalachian Gateway Project and the Sunrise Project – that specifically haul Marcellus gas to market.

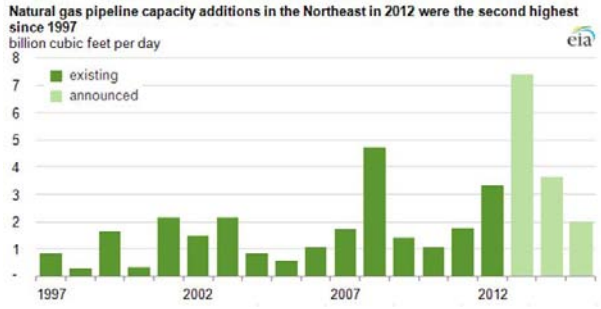
Exhibit 2. Gas Pipeline Additions Boost Production



Source: EIA

While we know there are additional gas pipeline projects proposed, we are not exactly sure which ones will be constructed and their anticipated in-service dates. Therefore, it is possible that Pennsylvania's gas output growth in 2013 and 2014 may be less dramatic than experienced in 2012.

Exhibit 3. NE Gas Pipeline Miles Near Record

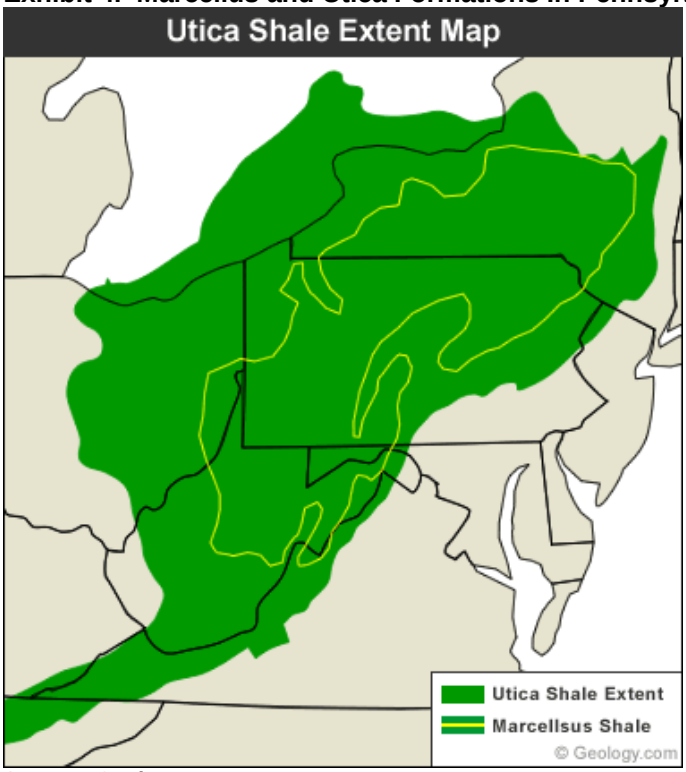


Source: EIA

It is important to note that the first horizontal wells were drilled in 2008 and the percentage they represented of total wells drilled has grown every year since

After peaking at 3,000 gas well starts in 2006, the trend in gas-oriented drilling in Pennsylvania has been downward. Wells drilled in 2007 and 2008 fell marginally from 2006's level, but then dropped sharply in 2009 with the recession following the 2008 financial crisis. It is important to note that the first horizontal wells were drilled in 2008 and the percentage they represented of total wells drilled has grown every year since. As we know, horizontal wells tapping shale formations such as the Marcellus and the Utica that underlay Pennsylvania are capable of producing much larger well volumes than traditional vertical wells, although the high initial production rates decline rapidly.

Exhibit 4. Marcellus and Utica Formations In Pennsylvania

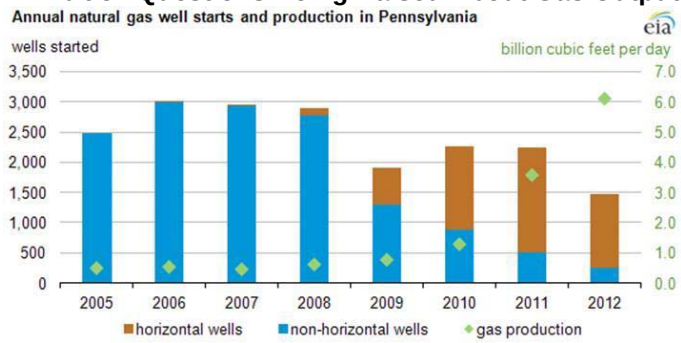


Source: *Geology.com*

This disclaimer, coupled with a data inconsistency between the Texas Railroad Commission and the EIA in a recent study we read, raises questions about the quality of the oil and gas production data being collected and reported

Natural gas production in Pennsylvania climbed from just under 3.5 billion cubic feet per day (Bcf/d) in 2001 to slightly over 6/Bcf/d in 2012. There were some interesting disclosures in the sourcing of the production data reported on the EIA web site. It noted that EIA production data was used for 2005-2010 due to reporting issues with the 2010 data provided by the Pennsylvania DEP. The EIA stated it used Pennsylvania DEP's production data for 2012 as their own data was not yet available, although they expect the two production volume datasets to be similar. This disclaimer, coupled with a data inconsistency between the Texas Railroad Commission and the EIA in a recent study we read, raises questions about the quality of the oil and gas production data being collected and reported.

Exhibit 5. Questions Being Raised About Gas Output



Source: EIA

The Railroad Commission sends its data to the EIA, but for the past several years the EIA has been reporting greater production volumes than Texas has reported

The author of the Texas study reported that after he noted the data discrepancy that he contacted the Railroad Commission for an explanation of why their data was different from that reported by the EIA. He was told they had no explanation. He also was told that the Railroad Commission sends its data to the EIA, but for the past several years the EIA has been reporting greater production volumes than Texas has reported. How is that possible? Failure to report or to report inaccurate well production data to the Texas Railroad Commission is a criminal offense. We have to believe that is also the case for reporting to a U.S. federal agency. Interestingly, the EIA failed to respond to the author's request for an explanation of the data discrepancy.

If Pennsylvania actually produced over 6 Bcf/d last year, it out-produced not only New Mexico but the entire Gulf of Mexico, and the states of Oklahoma and Wyoming

Another interesting item on the EIA's web site was the comment that it has asked Pennsylvania and eleven other states to participate in the agency's monthly Form 914 survey of natural gas production. At the present time, based on the latest data (December 2012) from the 914 survey, New Mexico with 3.46 Bcf/d of gas production is the smallest state reported separately. If Pennsylvania actually produced over 6 Bcf/d last year, it out-produced not only New Mexico but the entire Gulf of Mexico, and the states of Oklahoma and Wyoming. In fact, Pennsylvania would account for a quarter of the Other States reported total output of 24.19 Bcf/d. It would seem to be quite important for the EIA to make sure it is receiving

Pennsylvania data monthly as the state only reports conventional well data once a year and unconventional data twice a year. We have no explanation for the difference in reporting frequency (legislative?) and why the conventional data hasn't been shifted to the twice-yearly reporting schedule.

As Pennsylvania demonstrates, when the takeaway capacity becomes available, more natural gas output will show up

The lesson from the Pennsylvania natural gas production data is that analysts should be paying much closer attention to the growth of the pipeline construction planned within and near shale basins around the country. As Pennsylvania demonstrates, when the takeaway capacity becomes available, more natural gas output will show up. That phenomenon will continue even with the shift from dry gas drilling to crude oil and liquids-rich drilling. That trend is underway in Pennsylvania, as well as nationwide. The data on drilling for the first four months of 2011 and 2012 in Pennsylvania demonstrates that the number of new crude oil and liquids-rich gas wells increased from 164 wells to 263. It will be interesting to see what happens in the first four months of 2013, and the resulting impact on the state's natural gas production.

The Gulf of Mexico Is Back Based On Lease Sale Results

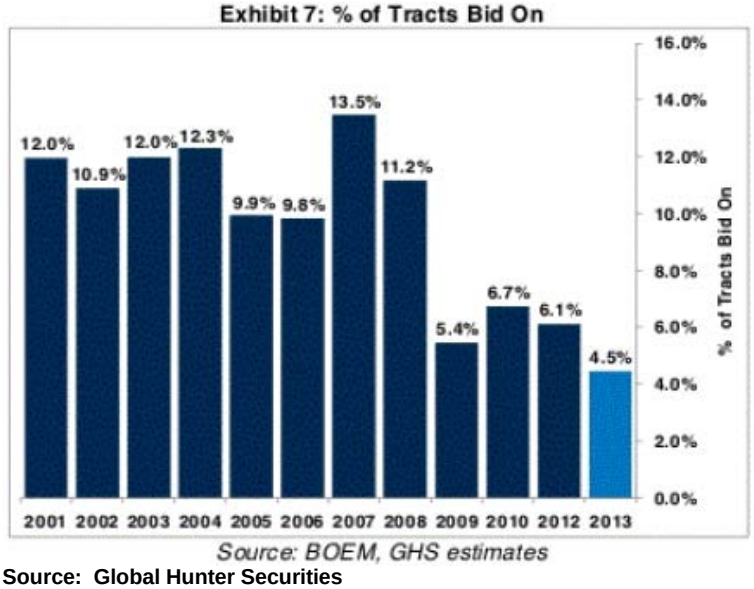
The media focused on the total dollar figures and the bidding intensity among companies over a few tracts

Two weeks ago the Department of the Interior reported the results of the Central Gulf of Mexico lease sale 227, which, based on the total amount of money oil and gas companies bid, suggested the industry is bullish on prospects in this region. As usual, the media focused on the total dollar figures and the bidding intensity among companies over a few tracts, but it may have missed some of the underlying trends that are shifting and will shape the Gulf's future.

The 320 tracts bid on represented only 4.5% of all the tracts offered, which was the smallest percentage since 2001

Some 52 oil and gas companies submitted 407 bids on 320 tracts offered by the government. BP plc. (BP-NYSE) did not submit a bid, although they were told by the Interior Department that they could. BP is currently prohibited from securing government contracts due to the settlement terms of the Macondo oil spill. The Interior Department told BP they could submit a bid and after a review would be informed whether they were able to be awarded the tract. We assume BP declined to invest the time and effort in what was likely to be nothing more than an exercise. What we don't know is whether BP bid as a partner with others, although their legal status could impact the award status. The 320 tracts bid on represented only 4.5% of all the tracts offered, which was the smallest percentage since 2001, as shown in Exhibit 6 on the next page.

Exhibit 6. Tracts Bid On The Smallest Percentage In Years

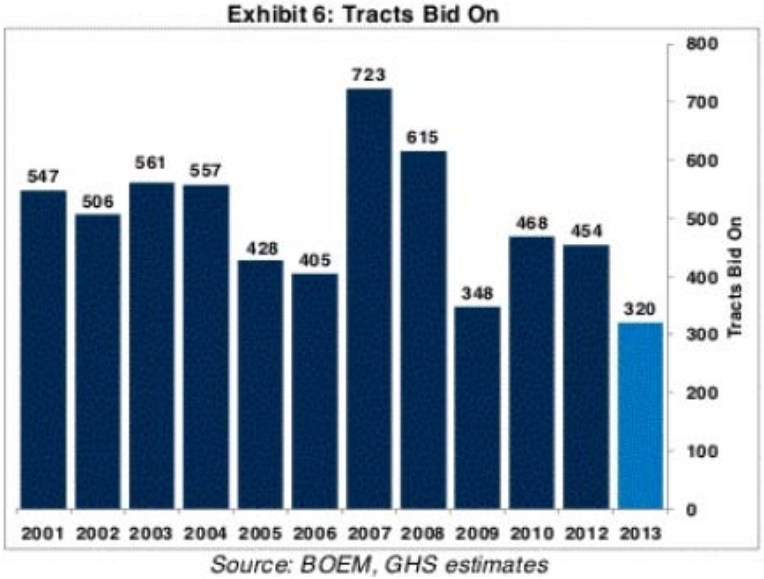


Source: Global Hunter Securities

The post-2000 period has generally demonstrated a downward trend, although there have been some very successful lease sales such as in 2007 and 2008

When the results of the sale are examined from the perspective of the total number of tracts bid on, the post-2000 period has generally demonstrated a downward trend, although there have been some very successful lease sales such as in 2007 and 2008. Those years appear to have been an aberration from the general trend of bidding in a mature oil and gas province. The high sale results were consistent with the speculative fever that gripped the U.S. and global economy immediately prior to the 2008 financial crisis.

Exhibit 7. Tracts Bid On Reflect Downward Trend



Source: Global Hunter Securities

BOEM altered some of the terms of the lease bids from prior sales

Federal officials, such as Interior Secretary Ken Salazar and Bureau of Ocean Energy Management (BOEM) Director Tommy Beaudreau, cheered the results of the sale, and pointed out that comparisons of this Central Gulf of Mexico sale to the prior one in 2012 should be made with caution since the prior sale reflected pent-up industry demand due to the absence of a sale in 2011 following the Macondo oil spill. Additionally, BOEM altered some of the terms of the lease bids from prior sales. Deepwater acreage minimum bids were boosted to $100 per acre compared to prior sale amounts of only $37.50 an acre. The minimum bid hike came following extensive analysis by BOEM showing that deepwater leases with high bids of less than $100 per acre experienced virtually no exploration and development. The deepwater tracts leased in this sale also carried escalating rental rates and tiered durational terms with relatively short base periods followed by additional time under the same lease if the operator drills a well during the initial period. This is the federal government's attempt to make sure that acreage leased offshore is drilled rather than becomes a Congressional talking point whenever gasoline prices soar about how many idle offshore leases the oil industry holds.

Extensive analysis conducted in the mid-1980s showed that between 1974 and 1984, the industry always acquired lease acreage that was never drilled

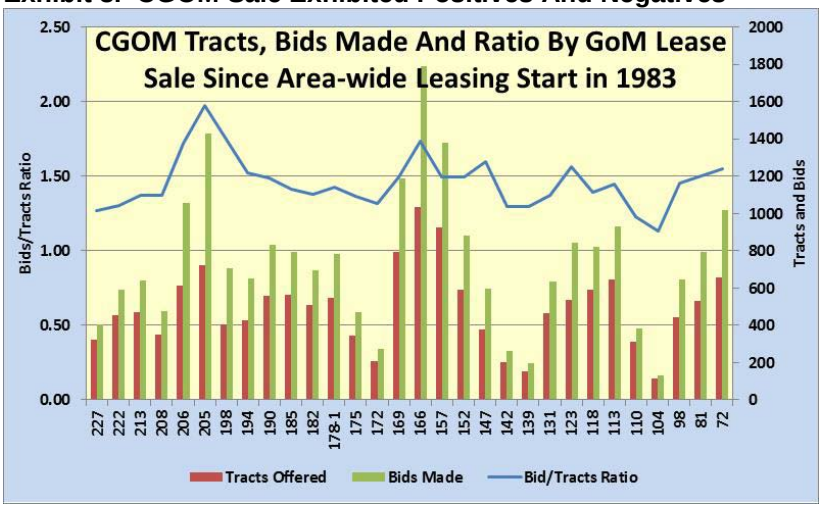
While we have not seen the BOEM analysis, we would be cautious about interpreting the data. Since the federal government shifted its offshore leasing program to area-wide lease sales in 1983, oil and gas companies have often purchased acreage with minimum bids as they attempt to lock up sufficient acreage spreads to cover geological/exploration theories they planned to test. Extensive analysis conducted in the mid-1980s showed that between 1974 and 1984, the industry always acquired lease acreage that was never drilled. That analysis shocked many in the industry who had always assumed that, prior to the introduction of area-wide leasing, all the acreage ever leased offshore was drilled. The practice of not drilling all leased tracts mushroomed once the industry was freed from the "nomination process for identifying acreage to be leased" in order to test unconventional geologic theories. If the theory proved wrong with a test well, then multiple tracts were often condemned and never drilled. We tend to believe that the shift to area-wide leasing in the Gulf and away from the acreage nomination system previously in effect contributed to the successful development of sub-salt plays, Lower Tertiary plays and the entire deepwater phenomenon.

A measure we follow when attempting to assess the success of a Gulf of Mexico lease sale is the ratio of bids made to tracts bid on. We have examined this ratio going back to the very first Central Gulf sale but more importantly since area-wide lease sales began in 1983. Exhibit 8 (next page) shows the tracts bid on, the number of bids made and the ratio of those figures for each Central Gulf sale since 1983. The sale results should be read from right to left, but what they show is how relatively consistent the ratio has been over this 30-year period. With commodity prices rising and falling and the fortunes of the industry ebbing and flowing, one might have

We attribute this consistency to the exploration philosophy of the modern oil and gas industry that companies are in the business of replacing and growing their reserves and production and they must continue to reinvest in the business every year if they expect to remain in business long-term

expected greater variability in the bids-to-tracts trend. We attribute this consistency to the exploration philosophy of the modern oil and gas industry that companies are in the business of replacing and growing their reserves and production and they must continue to reinvest in the business every year if they expect to remain in business long-term. This investment trend goes counter to the "speculator" view of oil company managements. Under that theory, oilmen would not be bidding during periods when oil prices were high and rising but would only bid when commodity prices were low. Yes, high oil prices, which provide incremental cash flows for the companies, are often the justification for accumulating greater exploration acreage inventory than when industry times are lean. But the stability of the bids-to-tracts ratio suggests greater, and more consistent, financial discipline than the speculator thesis.

Exhibit 8. CGOM Sale Exhibited Positives And Negatives



Source: BOEM, PPHB

The shallow Gulf of Mexico segment may be on the cusp of a revival after having been 'left for dead' by the emergence of the shale revolution onshore

The most notable figures to come from the lease sale results were the number of bids in deep and shallow water depths. According to data from BOEM, there were 131 bids for tracts located in water depths of 1,600 meters of water depth or greater but 85 bids for tracts in less than 200 meters of water depth. Those figures suggest to us that the shallow Gulf of Mexico segment may be on the cusp of a revival after having been 'left for dead' by the emergence of the shale revolution onshore. If accurate, it means better times for many of the more traditional domestic suppliers of offshore oilfield services. It has been the absence of activity in shallow water that has retarded the Gulf of Mexico recovery, but that may be about to change.

China Eases Energy Price Changes As IMF Slams Subsidies

While there can be much criticism directed at China's use of coal to generate its electricity, that becomes an economic decision since coal is cheaper, especially imported coal due partly to the impact of emission restrictions on coal's use in advanced economies such as the United States and Australia, plus the economic opportunity for other countries to monetize their coal resources

China has been the subject of a number of media articles recently about the serious pollution in the country's capital city of Beijing due to the use of coal as the primary generator of its electricity. Coupled with the almost unbridled growth of automobiles in the city and a reluctance to shut down local industry as it did during the last Olympics, China is being held up as exhibit number one in the global effort to reduce carbon emissions. While there can be much criticism directed at the country's use of coal to generate its electricity, that becomes an economic decision since coal is cheaper, especially imported coal due partly to the impact of emission restrictions on coal's use in advanced economies such as the United States and Australia, plus the economic opportunity for other countries to monetize their coal resources. The growth of carbon emissions due to an exploding population of new automobiles and trucks is the result of China's growing middle class, which desires to partake in a lifestyle that promote suburbs and automobile use. According to the International Energy Agency (IEA), China has accounted for 40% of global oil consumption growth in recent years. Part of that growth is the result of more automobiles, the cost of which is helped by government fuel subsidies.

Last week, China moved to revise its gasoline and diesel fuel pricing system to make it more responsive to global crude oil price changes and to enable the nation's refiners to begin producing cleaner fuels. Under the nation's prior fuel pricing scheme, last amended in 2008, fuel prices could be adjusted whenever the price of a basket of international crude oils changed by more than 4% over a 22 working day period. Under the new policy, the 4% trigger point will be scrapped and the measurement period shortened to 10 days.

These reductions represent declines of 3.2% and 3.4% from current average gasoline and diesel retail ceiling benchmarks

The National Development and Reform Commission, China's top economic planning body, stated: "The trigger point was [too] high and the price adjustment period was [too] long, and the system couldn't sensitively reflect the price change on the global crude market, which may result in speculation and arbitrage." The immediate impact of this policy shift is a reduction in gasoline prices by 310 yuan ($50) a metric ton and diesel by 300 yuan ($48) a ton. These reductions represent declines of 3.2% and 3.4% from current average gasoline and diesel retail ceiling benchmarks of 9,630 yuan and 8,810 yuan per ton, respectively. Ceiling benchmarks vary by region in China, but *The Wall Street Journal* calculates that after the reduction, the ceiling benchmark price for gasoline will be 9,320 yuan, or $4.12 a gallon.

Most of the business news coverage of the impact of this regulatory revision was on the benefits to the Chinese refining industry, and in particular, the country's major oil companies such as China Petrochemical Group, or Sinopec (SHI-NYSE), which has long

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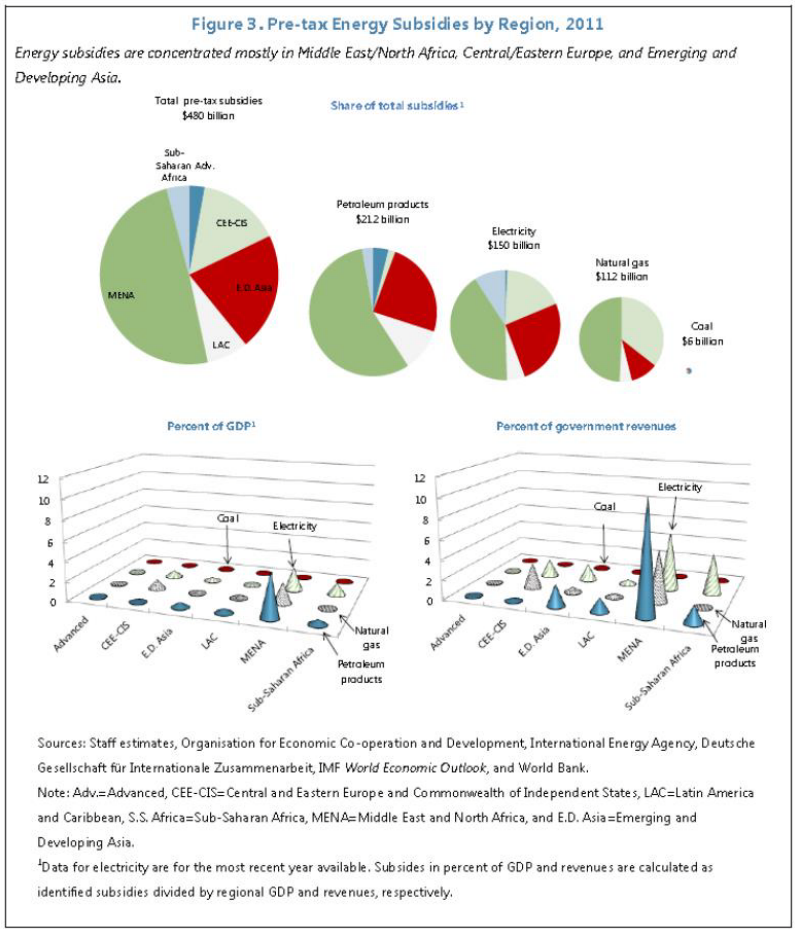
complained that the prior regulatory system artificially depressed its earnings. By making China's retail fuel prices more responsive to global crude oil pricing trends, it should help the country reduce fuel consumption and its carbon emissions. However, possibly the more important impact, even though it will take longer to become evident, will come from the upgrading of refineries allowing them to produce cleaner fuels. The old pricing system made it difficult for refiners to pass on the higher cost of cleaner fuels, so they weren't made.

At the same time China was indirectly attacking fuel subsidies through revamping its regulatory pricing system, the International Monetary Fund (IMF) released a 68-page study slamming the use of fuel subsidies. The IMF study said energy subsidies aggravate government budget deficits, crowd out public spending on health and education, discourage private investment in energy, encourage excessive energy consumption, artificially promote capital-intensive industries, accelerate the depletion of natural resources and exacerbate climate change. Otherwise countries can use them.

Exhibit 9. Oil Is The Largest Beneficiary Of Subsidies

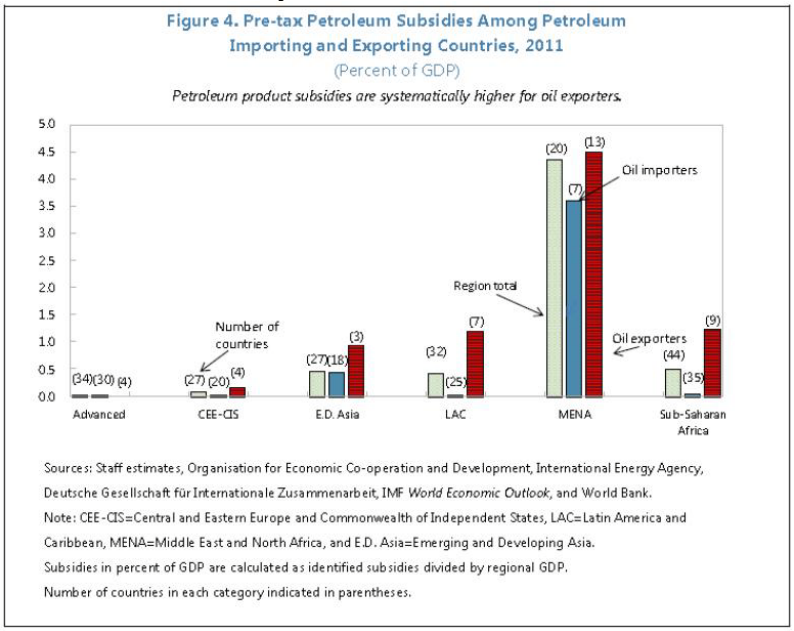


Source: IMF

The IMF says these subsidies added up to $481 billion in 2011, which represented 2% of government revenues, but 23% of revenues in the Middle East and North Africa

The most direct way governments subsidize energy is by charging households less than it costs to produce and distribute gasoline, cooking fuels and electricity. The IMF says these subsidies added up to $481 billion in 2011, which represented 2% of government revenues, but 23% of revenues in the Middle East and North Africa (MENA). One explanation for why fuel subsidies are so high in MENA is that providing low-cost energy is one way of keeping the citizens from demanding a share of the nation's energy wealth, thus enabling dictatorial regimes to remain in power.

Exhibit 10. MENA Is Primary User Of Petroleum Subsidies



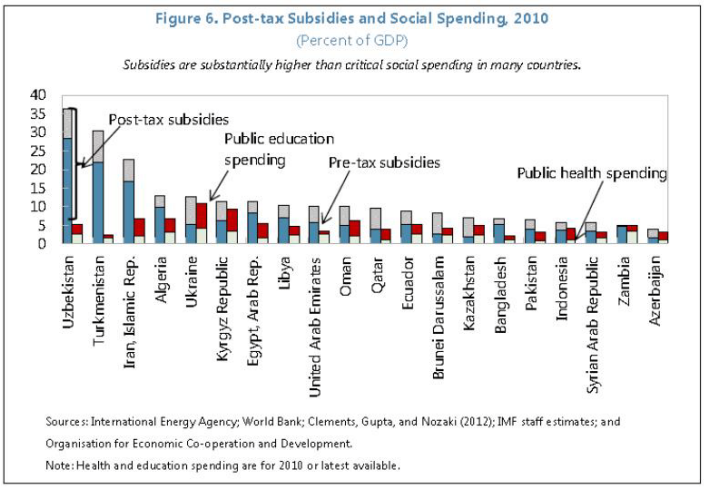
Source: IMF

Saudi Arabia has recognized that unless it either reduces fuel subsidies or develops alternative energy supplies, the country will lose a substantial proportion of its current oil exporting volumes to domestic consumption, reducing the Kingdom's future income

Keeping fuel costs low may seem harmless, but in many countries their governments spend more on subsidies than on education and health care for their populations. Another downside to the large subsidy strategy is that it boosts energy consumption, a phenomenon that is becoming acute in certain Middle East oil exporting countries. Saudi Arabia has recognized that unless it either reduces fuel subsidies or develops alternative energy supplies, the country will lose a substantial proportion of its current oil exporting volumes to domestic consumption, reducing the Kingdom's future income. While erosion of its oil exporting capacity would tighten global oil supplies and presumably boost oil prices helping the Kingdom's income short-term, it would hurt the country's long-term health as high oil prices would erode future oil demand.

According to the IMF, eliminating fuel subsidies would lift domestic prices and reduce energy consumption sufficiently to bring the world one-quarter of the way to meeting the energy consumption goal spelled out at the Copenhagen climate change meeting in 2009.

Exhibit 11. Fuel Subsidies Swamp Social Spending

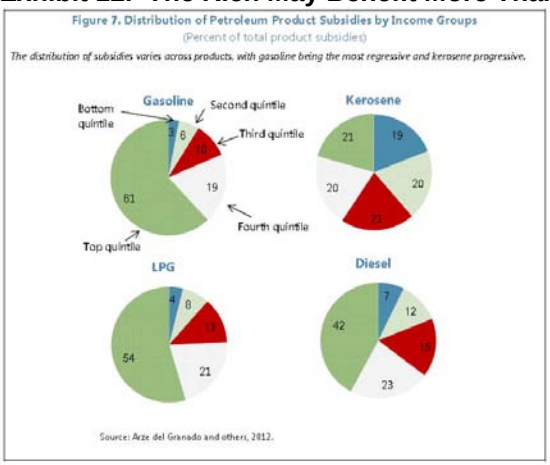


Source: IMF

According to the IMF's analysis, in low- and middle-income countries, the richest 20% of households receive six times the energy subsidies of the poorest 20%

The IMF examined one of the claims for why countries sustain energy subsidies even though it is hurting their budgets, which is that the subsidies are helping the poor. According to the IMF's analysis, in low- and middle-income countries, the richest 20% of households receive six times the energy subsidies of the poorest 20%. As we commented on recently, a similar study in Indonesia found that the middle class there was receiving three-times the benefit attributable to the nation's poorest citizens. In Saudi Arabia, where gasoline costs $0.45 a gallon, it is the wealthy and middle class that benefit from fuel subsidies since they are about the only people who own vehicles. Everyone does benefit from other fuel subsidies, however. The Saudi government currently spends $43 billion a year in order to keep fuel prices low, which is perversely boosting gasoline and diesel consumption, but it has preserved political peace in the nation.

Exhibit 12. The Rich May Benefit More Than The Poor



Source: IMF

Egypt's wheat stockpiles, at less than a 90-day supply, are of great concern for a country that is the world's largest wheat importer

As distasteful as it is for liberal institutions such as the IMF to condone energy subsidies, it is difficult to imagine many, if any countries with large populations will abandon fuel subsidies as the outrage it would spark could lead to the government being ousted. We see that struggle underway now in Egypt where the government has been in a two-year negotiation to secure a $4.8 billion loan from the IMF, which is demanding the government reign in its agriculture and energy subsidies that claim a third of its budget. As the loan negotiations have gone on, Egypt's cash reserves have declined from $36 billion to $17 billion. Recently, Egypt withdrew from the negotiating table certain concessions for agricultural and energy subsidies it made last fall that would reduce subsidies. Egypt's Muslim Brotherhood dominated government is clearly under pressure from the citizens who would be hurt by reduced or eliminated food and gasoline subsidies. The country's wheat stockpiles, at less than a 90-day supply, are of great concern for a country that is the world's largest wheat importer.

We doubt countries with food and fuel subsidies will be able to end them anytime soon. Rather, we anticipate subsidy programs will be subject to incremental changes that will lower their cost while minimizing the impact of higher prices on the citizens. At the margin, the reduction of fuel subsidies will erode future energy demand growth.

Random Thoughts About The World, Energy And Human Nature

Sometimes we are inundated by a lot of little items from our readings and meetings that cause us to stop and think, but don't necessarily lead to full-blown research efforts that underlie most of our Musings articles. The past two weeks have been such a time, so we thought we would just hit a few of the ideas with a comment.

Falling Victim To Groupthink

"The blind faith in wishful thinking"

Gillian Tett, the editor of the U.S. edition of the *Financial Times*, wrote a short column titled "The blind faith in wishful thinking," which caught our attention. The column was about a study produced by three American economists based at Princeton and Michigan dealing with bankers involved in subprime mortgage securitizations that contributed to the 2008 financial crisis and our ongoing challenges in solving the housing financing mess. Ms. Tett found the study fascinating because she was one of many financial observers to write a book about the causes of the financial crisis. In researching her book, Ms. Tett interviewed a number of bankers involved in securitization.

The three economists began their research by combing through the published lists of bankers who attended the 2006 American Securitization Forum's annual conference in Las Vegas. They randomly selected 400 mid-level securitization bankers. They then

The goal was to see whether the patterns among those real estate transactions were unique to the housing experts or just reflected something that all wealthy professionals tended to do

cross-referenced the names against publicly available data on subsequent real estate transactions and mortgages and analyzed whether those people had been trading properties and whether they made or lost money. The researchers then performed the same analysis on a group of 400 lawyers and 400 Wall Street equity analysts who were not involved in housing activity. The goal was to see whether the patterns among those real estate transactions were unique to the housing experts or just reflected something that all wealthy professionals tended to do.

Ms. Tett concluded, "it is groupthink and wishful thinking – not deliberate malevolence – that poses the biggest risk in finance"

Before doing the research, the economists expected to find that securitization experts would be good at judging when to sell properties and how to avoid housing market losses. They found that the figures showed "little evidence securitization agents' awareness of a housing bubble and impending crash in their own home transactions." The supposed experts "neither managed to time the market nor exhibited cautiousness in their home transactions.'' Additionally, they found these experts actually suffered bigger losses on housing than the random control group of lawyers who were not experts on housing at all. Ms. Tett concluded, "it is groupthink and wishful thinking – not deliberate malevolence – that poses the biggest risk in finance." We wonder whether that might also apply to E&P professionals involved in shale plays?

The American Petrochemical Industry Revolution

The U.S. has overtaken the Middle East as the region with the cheapest petrochemicals feedstock, for the first time since the Arabian Gulf's industry was established

A news item from *pastemart.com* reported that the U.S. has overtaken the Middle East as the region with the cheapest petrochemicals feedstock, for the first time since the Arabian Gulf's industry was established. The American shale revolution has created a boom in natural gas production that has contributed to the cheap gas feedstock in North America, driving a new generation of petrochemicals expansion in the U.S. "The cash cost per ton of ethylene in the U.S. in Q4-2012 was lower than the cash cost in Saudi Arabia," said Nexant vice president Graham Hoar, speaking at the MEED Middle East Petrochemicals 2013 conference. "It is a dramatic change in economics in the U.S."

"About 75 to 80 percent of the as-delivered cost of the (chemical) product relates to energy in some way"

The conclusion was reinforced by comments from James Gallogly, CEO of LyondellBasell (LYB-NYSE), recently. In talking about the impact of shale drilling in revolutionizing the U.S. chemicals industry, he said, "That's the biggest piece of news the U.S. petrochemical industry has had in the last 30 years. About 75 to 80 percent of the as-delivered cost of the (chemical) product relates to energy in some way. It could be the electricity we use at the plant, it could be the natural gas that fires the boilers or furnaces or the feedstocks we use." The impact of the growth in shale gas and liquids production and their contribution to reducing the market prices is contributing to a huge American industrial revolution.

Short-term Focus Versus Long-term Returns

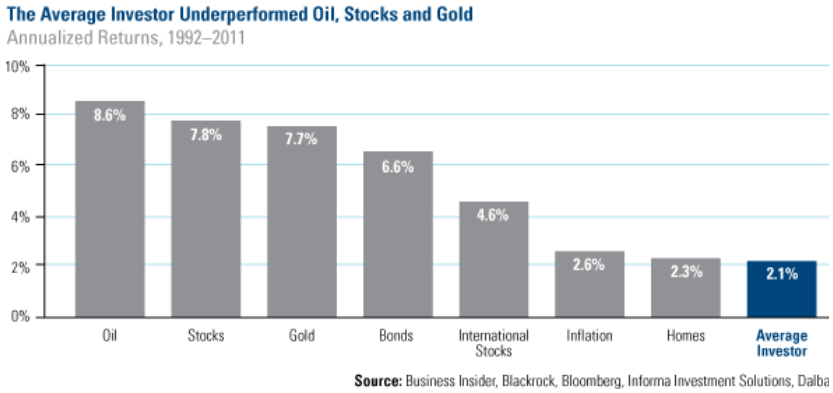
One topic of keen interest was how CEOs and boards were dealing with the short-term focus of Wall Street versus the long-term nature of energy industry projects

Last week, we participated in a small group of energy company directors in a discussion of various topics of mutual interest and concern dealing with corporate governance. The forum operated under Chatham House rules, meaning comments cannot be attributed to individuals. One topic of keen interest was how CEOs and boards were dealing with the short-term focus of Wall Street versus the long-term nature of energy industry projects. The consensus was that discussions and presentations to investors needed to be balanced between short-term developments and long-term value-enhancing investments and actions.

Solid energy companies with good managements and well-thought-out strategies can, and usually do, produce attractive returns over long time periods

In light of that discussion, we found the following chart from U.S. Global Investors very interesting. The mutual fund enterprise, based in Austin, Texas focuses on resource and developing economy investing. The chart confirmed what we have learned over 40+ years of researching and investing in energy securities – solid energy companies with good managements and well-thought-out strategies can, and usually do, produce attractive returns over long time periods. Yes, returns can be maximized by aggressive trading, but that strategy often leads to the maxim that "a long-term investor is one who missed a selling opportunity."

Exhibit 13. Long-term Energy Investors Well Rewarded



Source: U.S. Global Investors

An Economy On The Mend

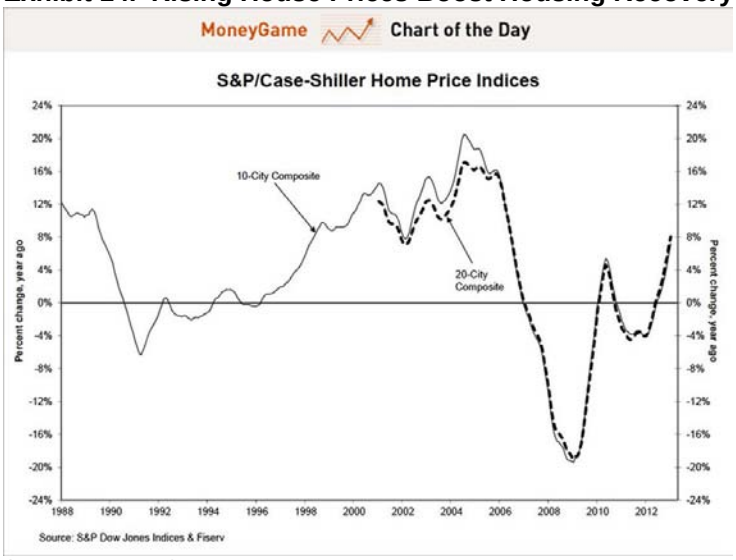
Our sense is that the ratio of positive to negative surprises is increasing

Economic statistics seem to be all over the map in recent months, although our sense is that the ratio of positive to negative surprises is increasing. Of course, we are still in the first quarter of the year and the better-than-expected economic statistics we are witnessing also were seen in the same period during each of the prior two years, only to collapse as summer approached. We don't know whether that pattern will repeat this year, but since we remain leery of the problems Cyprus could be presenting for Europe, we are not pounding any tables.

The latest Case-Shiller home price index reading suggests there is a real recovery underway in the housing sector, which has to be good news for the energy business

The latest Case-Shiller home price index reading suggests there is a real recovery underway in the housing sector, which has to be good news for the energy business. On the other hand, there is still a blockage in the home foreclosure system that is keeping a large number of potential homes from hitting the market. The blockage is contributing to a shortage of marketable homes that realtors suggest is primarily why housing prices are rising. So, if and when the foreclosure market is corrected, will there be a reversal in home prices, at least for a while?

Exhibit 14. Rising House Prices Boost Housing Recovery



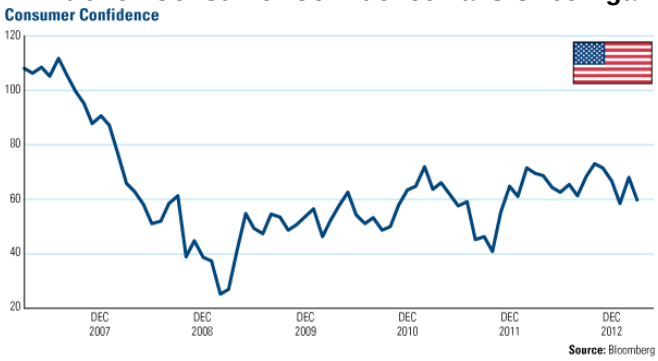
Source: ***MoneyGame.com***

In February 476,000 part-time, low-wage positions were created while 276,000 full-time jobs were eliminated

The market has been rejoicing at the nation's job creation figures of late, which showed that the economy added 236,000 new jobs in February and the unemployment rate declined to 7.7% from January's 7.9% rate. While these results were applauded, an examination of the details about the calculations suggests caution be exercised. For example, 296,000 workers were dropped from the labor force for having given up searching for a job. There are 6.8 million workers who the Labor Department does not include in the labor force who would like to work but cannot find a position. In addition, in February 476,000 part-time, low-wage positions were created while 276,000 full-time jobs were eliminated. Lastly, the employment to population ratio – the simple ratio of the number of citizens who want to work to the population - stood at 58.6%, the same as a year ago, but down from 63% in 2007. How much these employment trends are being influenced by employer concerns over the implementation of the Affordable Care Act (Obamacare), which is establishing baseline figures for measuring against next year when most of the tax and insurance mandates associated with the law go into effect, is anyone's guess. We have to believe it is having some impact.

The latest consumer confidence figures surprised analysts on the downside. It seems that this shouldn't have been a big surprise given the debate over the sequester and the White House's aggressive political campaign to make the budget reductions inflict the most pain on Americans possible in order to motivate support for Democrats over Republicans.

Exhibit 15. Consumer Confidence Falls Once Again



Source: U.S. Global Investors

Since the recovery began shortly after the 2008 financial crisis, the consumer confidence measure has essentially been flat

Since the recovery began shortly after the 2008 financial crisis, the consumer confidence measure has essentially been flat around the 60 level with the exception of a couple of optimistic periods and the drop in late 2011.

Cyprus Bailout A Success

To listen to the business media, the fact that Cyprus was able to cobble together a bailout program that earned the support of the European Community Bank and that there were no runs on the island's banks when they reopened last Thursday means the Euro-crisis is over. However, the comment from Jeroen Dijsselbloem, who heads the Eurogroup of euro-area finance ministers to reporters that the next time a country with a highly-leveraged banking system like Cyprus gets in trouble, "the response will no longer automatically be that we'll come and take away your problem." He went on to say that if a bank can't solve its own problems, "then we'll talk to the shareholders and the bondholders, we'll ask them to contribute in recapitalizing the bank, and if necessary the uninsured deposit holders." If true, although it was reported that Mr. Dijsselbloem retracted his comments shortly after making them, then the game is changing in Europe.

Will we look back on Cyprus being the equivalent of Archduke Ferdinand of Austria's assassination?

We continue to wonder whether we will look back on Cyprus being the equivalent of Archduke Ferdinand of Austria who's driver made a wrong turn that led to his assassination that is credited with igniting World War I, the Russian Revolution, the Spanish Revolution, the rise of the communists in China, Hitler in Germany and Mussolini in Italy, and World War II. Big things can often come from small events.

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