
MUSINGS FROM THE OIL PATCH

May 10, 2011

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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

Gas Shales Face Conflicting Future Based On Recent Events

A good friend and student of the energy business, and especially the ongoing shale revolution, cautions that there should be warnings about gas shale resources, much like the tobacco industry places on packs of cigarettes. Since we address potential U.S. natural gas resources in the following article, we felt a warning appropriate.

Caution: *The term “resources” refers to hydrocarbons that cannot be produced commercially now, and maybe never, at any price. Also, the resource hydrocarbons may not exist, or are sequestered in such a way that they may never be located. Placing any reliance on this number to meaningfully add to our national energy sources during your lifetime could be hazardous to your financial health.*

The good news for the country contained in the 2009 report is that the PGC found greater gas resources than they had estimated at the end of 2008

On April 27, the Potential Gas Committee (PGC) based at the Colorado School of Mines, issued its 2011 report on the state of natural gas resources in the United States as of the end of 2010. The good news for the country contained in the 2009 report is that the PGC found greater gas resources than they had estimated at the end of 2008. In that earlier report, the PGC highlighted the impact of gas shales on its estimate of potential gas resources showing that the entire growth between 2006 and 2008 in its estimate of the amount of technically recoverable natural gas resources was due to this asset class. It was this report and the estimated size of the gas shale potential resource – 615.9 trillion cubic feet (Tcf) of gas – that gave rise to the belief this country has 100+ years of supply. While the momentum behind the gas shale revolution had been building since Mitchell Energy, and its eventual owner, Devon Energy (DVN-NYSE), began proving the commerciality of this resource in the late 1990s, industry, investment and media focus truly heated up following the 2009 PGC report.

Despite the best efforts of the PGC and serious analysts of the

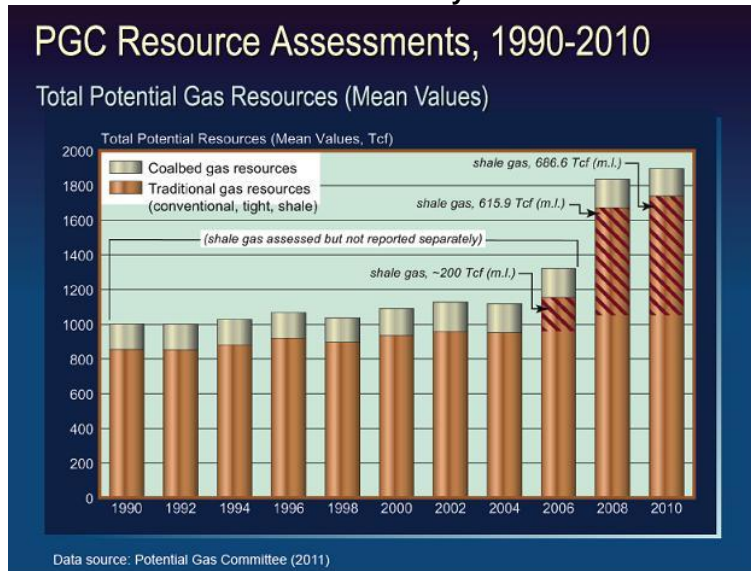
The effort to tame somewhat the claims about the gas revolution continued in the recent PGC press release announcing its 2010 resource estimates

The United States has an estimated total available future supply of 2,170 Tcf, an increase of 89 Tcf over the previous assessment

economics of natural gas resources, the claims of decades of increased supply due to gas shales have become a driving force behind the push in this country to use more gas in electric power generation and in our transportation system. The effort to tame somewhat the claims about the gas revolution continued in the recent PGC press release announcing its 2010 resource estimates. Dr. John B. Curtis, Professor of Geology and Geological Engineering at the Colorado School of Mines and the Director of the Potential Gas Agency, was quoted as saying, "Assessments of the Potential Gas Committee are 'base-line estimates' in that they attempt to provide a reasonable appraisal of what we consider to be the 'technically recoverable' gas resource potential of the United States." This means the PGC did not assume either a timetable or a specific gas price that would lead to the discovery and production of these potential resources.

The PGC report estimates that the U.S. has potential gas resources of 1,898 Tcf, which includes 1,739 Tcf of gas attributable to traditional resources (conventional, tight sands and carbonates, and shales) and 159 Tcf of gas in coalbed reservoirs. This is the highest estimate of potential gas resources in the PGC's 46-year history. Compared to the 2008 report, the increase in resource potential was a net change of 61.4 Tcf, or 3.3%, which is comprised of a 4%, or 67 Tcf, increase in traditional resources and a 2.7%, or 4 Tcf, decline in coalbed resources. When the PGC estimated resource potential is combined with the Energy Information Administration's (EIA) estimate of 273 Tcf of proved dry natural gas reserves as of year-end 2009, the United States has an estimated total available future supply of 2,170 Tcf, an increase of 89 Tcf over the previous assessment.

Exhibit 1. Gas Estimate Boosted By More Shale Resources

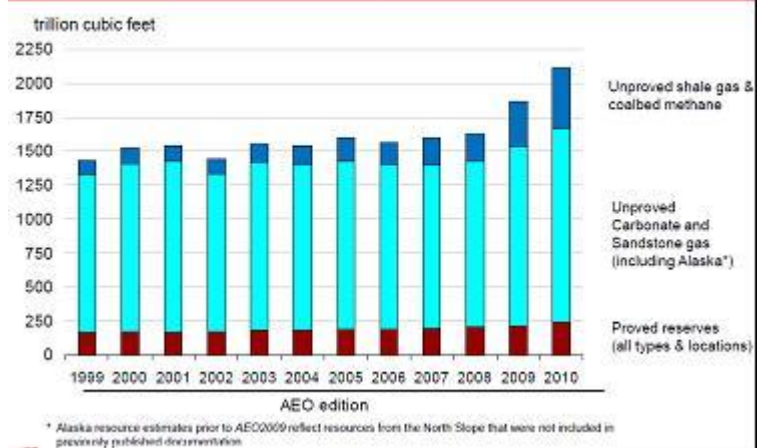


Source: Potential Gas Committee

Unfortunately, the EIA has adopted the myth that resource potential equates to proven reserves

The PGC's estimate of total natural gas potential resources compared quite favorably with the estimate made late last year by the EIA. Its estimate was that the United States in 2010 had a total of about 2,125 Tcf of reserves and resource potential. The EIA's 2011 estimate has been increased significantly to 2,550 Tcf due to an increase in the amount of shale gas resource potential. Unfortunately, the EIA has adopted the myth that resource potential equates to proven reserves. That view was demonstrated when in 2010 the EIA determined that based on its forecast of domestic gas consumption for the year and the total estimated natural gas resource base, the U.S. could meet its demand for 110 years.

Exhibit 2. EIA Gas Estimate Boosted By Shales
 Shale gas has been the primary source of recent growth in U.S. technically recoverable natural gas resources



Source: EIA

The decline was greatest for the Rocky Mountain region at -30.4 Tcf, followed by -2.6 Tcf and -2.4 Tcf declines for the Mid-Continent and North Central regions, respectively

An interesting aspect of the PGC report, however, was the regional breakdown of potential gas supply and the changes by region from the committee's prior estimate. In the traditional gas potential, the Gulf Coast total increased by 50.8 Tcf, or about 11.2%. That increase reflects the growth of the Eagle Ford Shale formation, which has only recently blossomed. On the other hand, the Marcellus Shale, supposedly the largest U.S. gas deposit and certainly the largest in the Atlantic region, displayed a two-year increase of only 0.1 Tcf, or essentially flat. Interestingly, several of the other regions showed declines from 2008. The decline was greatest for the Rocky Mountain region at -30.4 Tcf, followed by -2.6 Tcf and -2.4 Tcf declines for the Mid-Continent and North Central regions, respectively. The Pacific region increased by 2.7 Tcf, while Alaska showed no change, although this supply has no impact on the domestic natural gas market. Coalbed gas resources were down 4.4 Tcf between the two surveys.

Exhibit 3. Land Gas Concentrated In Atlantic And Rockies
Regional Resource Assessment



Source: Potential Gas Committee

His pitch is that by converting all the heavy-duty trucks in the U.S. from diesel to natural gas fuel we would cut the country's need for imported oil from OPEC in half

The claims about how large the gas resource potential is in the United States continue to mushroom, pushed by long-time supporters of using greater volumes of natural gas to reduce the country's energy import needs and other promoters with vested interests in a growing role for natural gas. On the same day that the PGC report was released, T. Boone Pickens, the former and long-time oil and gas company executive and now energy hedge fund manager, appeared on CNBC's "Squawk On the Street" early morning investment show and discussed his push for legislation that would enhance the government's support for increased use of natural gas, especially in the transportation sector. His pitch is that by converting all the heavy-duty trucks in the U.S. from diesel to natural gas fuel we would cut the country's need for imported oil from OPEC in half.

He said he believes the U.S. actually has gas reserves in the range of 4,000 Tcf, or 700 billion barrels of oil, or twice what the public analysts believe

In his presentation, Mr. Pickens said that the public analysts were willing to concede that the country has at least 2,000 Tcf of gas reserves, which he calculates is the equivalent of 350 billion barrels of oil equivalent, or more than the estimated crude oil reserves attributed to Saudi Arabia. He said he believes the U.S. actually has gas reserves in the range of 4,000 Tcf, or 700 billion barrels of oil, or twice what the public analysts believe. The natural gas legislation Mr. Pickens has been pushing has nearly 200 co-sponsors in the House of Representatives, including both Democrats and Republicans, he said. He is sure the bill will be approved by the House and also anticipates it will be passed by the U.S. Senate and then signed by the president. A report issued by Washington Analysis a few weeks ago suggested they did not see the legislation being passed by the Senate due to certain provisions attached to the bill. I guess we will have to wait and see when Congress returns from its Easter vacation.

The spill occurred on the one-year anniversary of the Deepwater Horizon accident and resulting oil spill from BP Ltd.'s Macondo well in the Gulf of Mexico

In the meantime, the gas shale business got a black eye two weeks ago when a well Chesapeake Energy Corp. (CHK-NYSE) was drilling in Leroy Township, Bradford County, Pennsylvania, had a discharge of fracturing fluid flowback that spilled across the neighboring farm fields and into Towanda Creek and an adjacent tributary. The spill occurred on the one-year anniversary of the Deepwater Horizon accident and resulting oil spill from BP Ltd.'s (BP-NYSE) Macondo well in the Gulf of Mexico. Fortunately there were no injuries or fire caused by the spill, and according to media reports, little or no environmental damage. The accident, however, caused Chesapeake to elect to shut down all its hydraulic fracturing activity in Pennsylvania and West Virginia until the cause of the accident has been determined.

Exhibit 4. Chesapeake's Atgas 2H Drilling Pad



Source: www.marcellus-shale.us/seeps_leaks_spills.htm

The reportedly 13-hour response time needed for well-control specialists, Boots & Coots, to arrive on the scene has created a minor media fury

The well site has a bucolic look from a distance, but up close it resembles what many of us associated with the oil and gas industry picture as an active well site – lots of equipment, dirt/mud depending on the weather, and hard working people. This spill achieved a high profile because it is in the heart of the region most opposed to hydraulic fracturing. The reportedly 13-hour response time needed for well-control specialists, Boots & Coots, to arrive on the scene has created a minor media fury. *ProPublica.org*, the investigative news web site, reported that Chesapeake well lost control at about 11:45 pm on April 19th and the team from Boots & Coots didn't arrive until 1:25 pm the next day. The well was totally controlled on April 25. Chesapeake reported that a company well-control specialist arrived at the well site within 30 minutes from the well control loss and that three additional company specialists arrived within eight hours. Chesapeake reported its internal team had shut down 70% of the well's flow before the Boots & Coots team arrived.

Exhibit 5. Vacuum Tanker Trucks Onsite For Spill Clean-up

Source: www.marcellus-shale.us/seeps_leaks_spills.htm

Chesapeake declined the help from the DEP because it already had an arrangement with Boots & Coots

The reason why this situation has received such attention is because the Pennsylvania Department of Environmental Protection (DEP) has an arrangement with CUDD Pressure Control, which has an office with staff and equipment in Pennsylvania specifically to be able to provide rapid response to well control events. The agreement with the DEP was put in place in response to long delays on previous well accidents. This past January, the CUDD team responded to a well incident and had it under control within four hours, demonstrating the value of the contract. Chesapeake declined the help from the DEP because it already had an arrangement with Boots & Coots.

How these two tales play out remains to be seen

One could almost describe the events of the past two weeks as the manifestation of Charles Dickens' opening line from his novel, *A Tale of Two Cities*: *"It was the best of times, it was the worst of times, it was the age of wisdom, it was the age of foolishness, it was the epoch of belief, it was the epoch of incredulity, it was the season of Light, it was the season of Darkness, it was the spring of hope, it was the winter of despair, we had everything before us, we had nothing before us, we were all going direct to heaven, we were all going direct the other way - in short, the period was so far like the present period, that some of its noisiest authorities insisted on its being received, for good or for evil, in the superlative degree of comparison only."* How these two tales play out remains to be seen, and much like Dickens novel, there likely will be many twists and turns on the way to a conclusion.

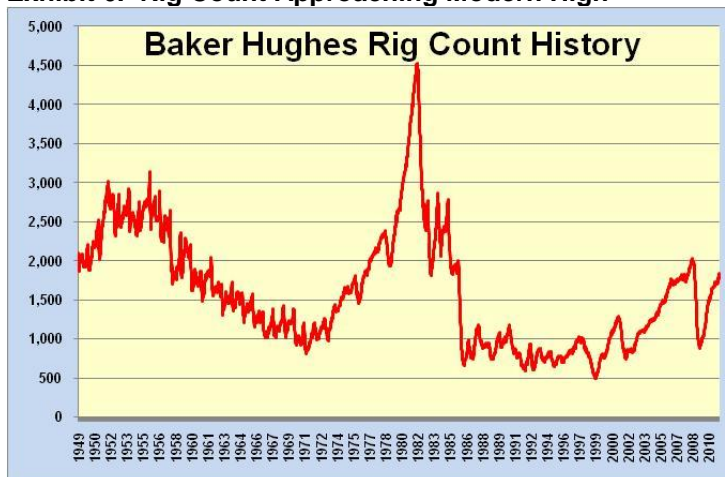
Rig Count Climbs; Rig Orders Up; Overbuilding Coming?

If you've been watching the weekly rig count announcements, you've

Since the start of 2011 the U.S. active rig count has climbed by 142 with a net of 124 rigs added just during the past eight weeks

seen the count climbing sharply in recent weeks. In fact, since the start of 2011 the U.S. active rig count has climbed by 142 with a net of 124 rigs added just during the past eight weeks. Since the end of March, the offshore rig count has experienced a net two-rig addition, so the rig count growth has been virtually entirely on land. In fact, the offshore fleet accounts for only 1.6% of the total U.S. active rig count.

Exhibit 6. Rig Count Approaching Modern High



Source: Baker Hughes, PPHB

With oil prices comfortably over \$100 a barrel throughout April and into the first week of May, drilling has actively shifted in favor of crude oil and natural gas formations containing high liquid content. But E&P companies continue drilling gas shale leases in order to hold them by production. As a result, the active rig count is nearing its 2008 peak when crude oil prices approached \$147 a barrel.

If the current pace of increase continues for several more months, we will reach the highest rig count since 1985, some 26 years ago

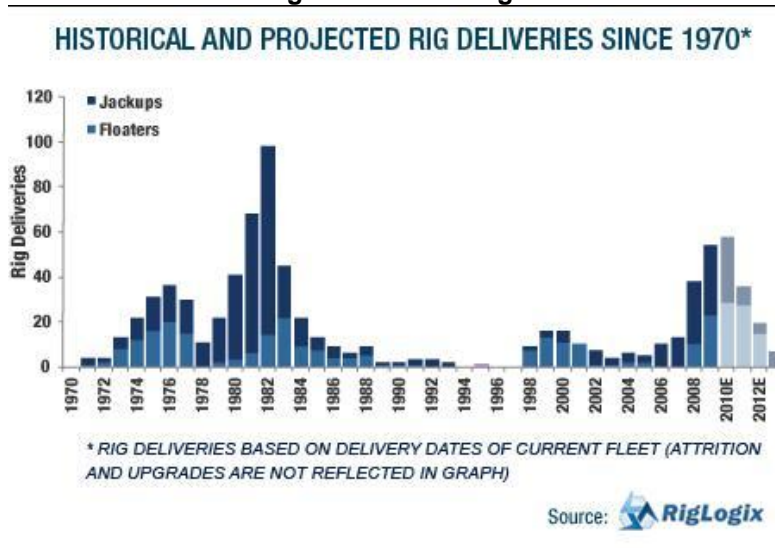
When one looks at the history of the U.S. rig count as reported by Baker Hughes (BHI-NYSE) since 1949, he can see that if the current pace of increase continues for several more months, we will reach the highest rig count since 1985, some 26 years ago. In response to increasing drilling activity, drilling contractors are being challenged since the types of rigs required to exploit the targeted resources – oil and gas shales – must be larger, more powerful and technologically more sophisticated. A dichotomy has developed in the rig market – new, larger, more powerful rigs are in great demand while older, smaller, less powerful rigs are being shunned. For the rig count to reach that new peak we are suggesting, drilling contractors must expand their fleets, something currently underway. The question bothering some in the industry is: Will we overbuild the rig fleet as we have in virtually every past drilling boom?

If we look at the offshore drilling market, the recent spate of new deepwater drilling rig orders and the emergence of numerous start-up drilling companies are reminiscent of the boom days seen in the

There will be 57 new offshore drilling rigs delivered in 2011, 34 in 2012 and 44 in 2013 and beyond

late '70s and early '80s. Most of those start-ups succumbed during the industry downturn of 1983-1986. Their rigs, however, didn't go away, and in fact many are still operating in the fleets of some of the largest offshore drilling contractors today. As of April 25, according to data from investment bank UBS, there will be 57 new offshore drilling rigs delivered in 2011, 34 in 2012 and 44 in 2013 and beyond.

Exhibit 7. Offshore Rig Orders Growing



Source: RigLogix

The chart in Exhibit 7 is slightly dated but the visual is still valid. Based on the projected rig fleet additions for 2011-2013+, two of those years will rank right behind the record offshore rig delivery years of 1981 and 1982 at the end of the last great offshore drilling boom. Those record delivery years came as a result of the historic years of 1980 and 1981 when roughly 255 offshore rigs were ordered.

We always worry about all the drilling contractors acting on market growth projections assuming they are the only ones reacting to that information

The split between new jackups and floating (semisubmersibles and drillships) drilling rigs is particularly interesting as their shares are about equal. There are 69 jackups to be delivered while 66 floaters are scheduled to arrive. The number of jackups is less concerning as a large number of older rigs (those built in the late '70s and early '80s) are due to be retired. The same cannot be said for the floating rig fleet where it looks like all the new rigs will be additive. That fleet segment expansion is being driven by the belief that deepwater drilling worldwide, especially in Brazil and West Africa, will grow rapidly. We always worry about all the drilling contractors acting on market growth projections assuming they are the only ones reacting to that information. Historically, large newbuilding programs are a sign of potential rig fleet overbuilding.

There may be a need for an additional 250 land rigs in each of the next two years

Could the same thing be happening in the land rig market? No one knows the answer based on our research and questioning of industry participants. We believe, however, the readers of the *Musings* will correct our suggested rig fleet additions if we are wrong. Based on reports from Wall Street analysts who supposedly have done bottoms-up counts of the field-by-field rig needs of producers, there may be a need for an additional 250 land rigs in each of the next two years. This means the land drilling industry will be in a “rig-short” environment soon, suggesting rig day rates should jump sharply in the second half of this year.

We estimate contractors may only be adding about 125 new rigs this year

At the same time, based on reports by a handful of large land drilling contractors and guessing about the behavior of the smaller ones, we estimate contractors may only be adding about 125 new rigs this year. As natural gas prices start rising in response to a faster than anticipated shrinking of gas inventories, we anticipate a possible panic soon by producers to contract rigs as perceived rig availability disappears. That panic may be put on hold, however, if the data released last week signals a meaningful slowdown in the economic recovery and less future energy demand.

Until the profitability of gas shale drilling rises, the Black Swan for the domestic drilling industry will be a large natural gas producer running out of available cash and having to shut down drilling operations. We aren't putting odds on that Black Swan, but suggest preparing for that eventuality.

Housing And Autos Still Key Growth – 1Q11 GDP Not Good

Gross domestic product (GDP) rose at a 1.8% annual rate in the first quarter, down from 3.1% in 2010's fourth quarter

Just over a week ago, the federal government released its first assessment of the performance of the U.S. economy and the results were not good. Gross domestic product (GDP) rose at a 1.8% annual rate in the first quarter, down from 3.1% in 2010's fourth quarter. The same day, the estimate for initial jobless claims was released by the Labor Department showing that the number of Americans filing for unemployment insurance increased by 25,000 over the prior week to 429,000, the highest level since January. Even the 4-week moving average, used to smooth out volatility, rose to 408,500 from 399,250. Last Friday, the April unemployment data was released showing an increase of 244,000 jobs but also that the unemployment rate rose to 9.0% from 8.8% in March.

Two months ago, the projected first quarter GDP growth rate was as high as 4.3%

The GDP estimate was below the most recent survey of economists by *CNNMoney* that suggested growth would be at a 2.0% or slightly better rate. Growth rates had been ratcheted down as the quarter progressed as economic data during the period showed significant slowing. Two months ago, the projected first quarter GDP growth rate was as high as 4.3%, which signaled acceleration in the economy's recovery. Now, many people are beginning to question the recovery's health, although the economists remain optimistic that GDP growth for all of 2011 will still average 3.1%.

The favorite trick of Washington and the bean counters in the Labor Department is to ignore food and fuel and concentrate on the “core index” inflation

“Temporary” seems to be the operative word in Washington now, at least as far as the economy goes. Federal Reserve Chairman Ben Bernanke prefers “transitory,” which has a more academic ring to it, when he wants to dismiss the impact of the rise in gasoline and food prices on inflation in this country. His vice chairperson, Janet Yellen, tends to go with “temporary” also, as she explains why gasoline and food inflation should not dissuade the Federal Reserve from its easy money policies. The favorite trick of Washington and the bean counters in the Labor Department is to ignore food and fuel and concentrate on the “core index” inflation, which can be easily manipulated by factoring in improvements in “qualitative” measures of the products being monitored to determine price hikes.

As financial author and newsletter writer, Bill Bonner, puts it, “We’ve always wondered why there is so much debate about the rate of inflation. It seems like such a simple thing to track. You go in the store. You buy a box of Wheaties. You write down the price. Next month, you do the same thing. What’s so hard about that?”

“But what if the box is smaller next month? What if the Wheaties are twice as good? What if you can get the same enjoyment from a box of Wheatie-Puffs at half the price?”

“What’s the real rate of inflation? It depends on how you figure it. The Labor Department shows consumer price inflation at barely over 2%. John Williams’ ShadowStats puts the figure close to 8%.” For those who are not familiar with John Williams, he is an economist who re-creates government statistics based on how they used to be calculated in the past before certain “improvements” in their measurement were instituted.

This was obviously the reason why Community Coffee, the brand we drink, had changed its bag from 16 ounces to 12, yet had not reduced the price

We recently had our own revelation about consumer inflation after reading a headline for a *Financial Times* story that highlighted that coffee futures had climbed over the \$3.00 per pound mark. The article pointed out that coffee prices now were the highest they have been in 34 years and that the price had doubled over the last seven months. As I mentioned this to my wife, she informed me that this was obviously the reason why Community Coffee, the brand we drink, had changed its bag from 16 ounces to 12, yet had not reduced the price.

The bad thing is that inflation is accelerating as the annualized rate of price increase over the past three months is 7.4%

Mr. Bonner pointed out that Massachusetts Institute of Technology (MIT) had initiated a project to try to track inflation better than the government. The Billion Prices Project has been established to monitor a multitude of consumer prices constantly off the web rather than using a small basket of goods that are monitored only periodically. According to the two MIT professors who devised the index, over the past 12 months, prices have risen 3.2%. The bad thing is that inflation is accelerating as the annualized rate of price increase over the past three months is 7.4%.

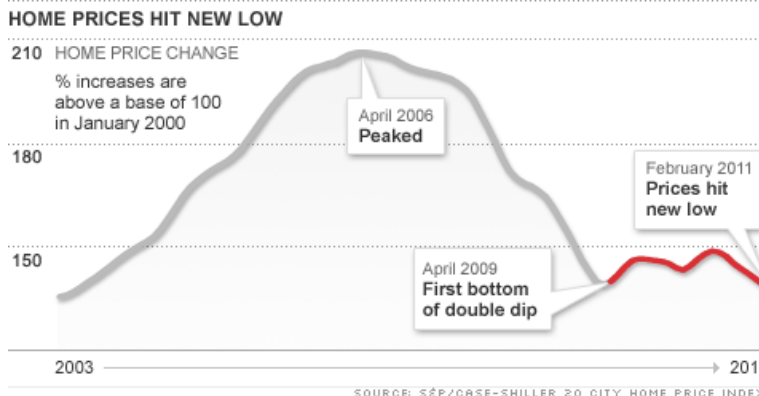
Mr. Bonner asks is why investors are willing to buy U.S. Government bonds with yields well below the current real rate of inflation

The question Mr. Bonner asks is why investors are willing to buy U.S. Government bonds with yields well below the current real rate of inflation. As Mr. Bernanke was preparing to hold his and the Federal Reserve's, first-ever press conference, 10-year Treasury notes were yielding 3.34% while 30-year Treasury bonds were at 4.42%. Two-year government paper was changing hands at a 0.63% yield. The answer to the question, according to Mr. Bonner, is that investors believe Mr. Bernanke and Ms. Yellen who say that inflation is temporary.

February prices dropped by 3.3% to 139.27 just barely above the post-crisis low of 139.26 recorded in April 2009

In the housing sector, the latest Standard & Poor's/Case-Shiller index of home prices in 20 cities across the country showed that February prices dropped by 3.3% to 139.27 just barely above the post-crisis low of 139.26 recorded in April 2009. This marks the seventh consecutive decline. The housing market experienced 32 consecutive monthly declines after peaking in April 2006, but then rebounded for 13 straight months ending last June. Since then the news has been consistently bad.

Exhibit 8. Home Prices Near Double-dip Decline



Source: *CNNMoney*

Every time the banks sell a foreclosed property at a low price, they can have an impact on the value of neighboring homes, further influencing the downward price spiral

The explanation for the recent drop is that distressed properties - bank foreclosures and short sales - now account for 30% of all home sales and they are being sold at 34% discounts to conventional home sales. The problem for the near-term is that after a hiatus in bank foreclosures due to the investigations over paperwork problems with mortgages, etc., the banks are now moving forward more aggressively to deal with their problem loans. Every time the banks sell a foreclosed property at a low price, they can have an impact on the value of neighboring homes, further influencing the downward price spiral.

According to an article in *Housing Wire*, a RealtyTrac senior vice president said that major banks hold one million repossessed homes, but only 30% have made it to the market. The firm also reported at the beginning of this year it believed it was possible there would be four million foreclosures in 2011, and that doesn't count

Motor vehicle output contributed 1.4 percentage points to the first quarter's growth

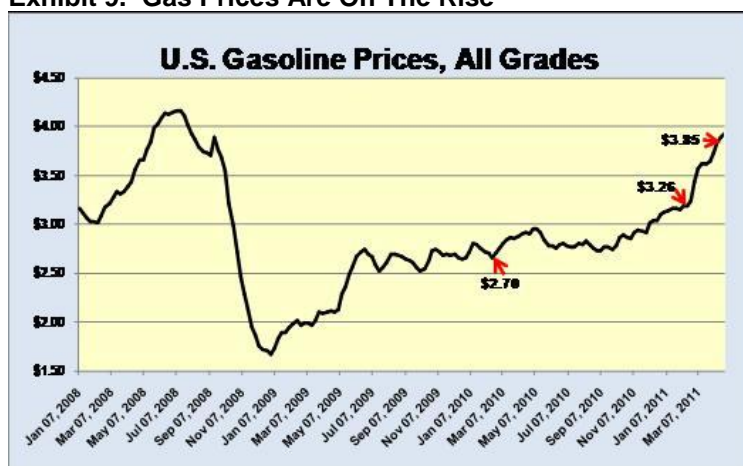
the nearly five million homes financially “underwater” on their mortgages that have not begun the foreclosure process. This shadow inventory of distressed properties suggests it will be a while before the housing market can begin to recover.

The auto sector appears to be much healthier, at least as measured by the first quarter GDP estimate. Motor vehicle output contributed 1.4 percentage points to the first quarter's growth. But that was before gasoline prices really ramped up and the effect of the late March Japanese earthquake on automobile manufacturers is considered. While it was initially thought that the automobile supply chain disruption would be modest and largely impact only Japanese auto manufacturers, this is not the case as most domestic manufacturers have also had to shut down various production lines at times due to parts shortages. The worst hit company, Toyota Motors (TMC-NYSE) has suggested it may not be until November that it has all its worldwide production back at capacity.

Consumers are cutting their driving, switching to mass transit and having to spend a larger portion of their income for fuel at the same time they are dealing with higher food bills

An equally troubling aspect of the automobile sector is the impact of rising gasoline prices on car sales, especially coupled with the pressures to both meet the more stringent fleet emission standards and to make money. With gasoline prices nationwide near \$4 a gallon and considerably higher in various regions, consumers are cutting their driving, switching to mass transit and having to spend a larger portion of their income for fuel at the same time they are dealing with higher food bills. More fuel-efficient vehicles are what the public demands, but the leading company in that segment, Toyota, has been limited in its ability to meet the demand.

Exhibit 9. Gas Prices Are On The Rise



Source: EIA, PPHB

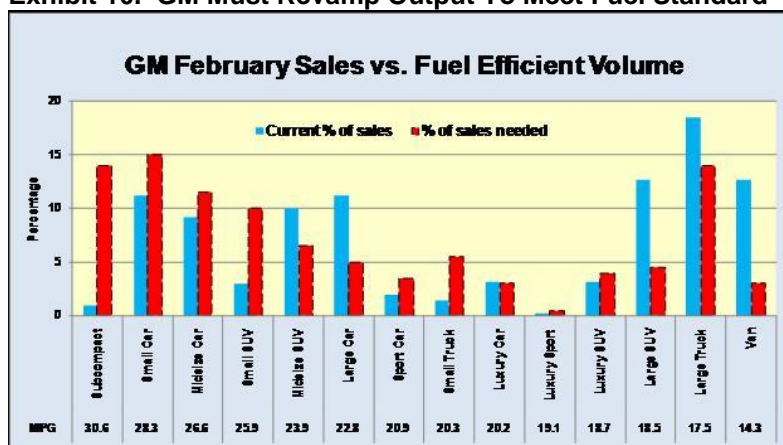
Exhibit 9 shows how gasoline pump prices have climbed in recent months. In the waning days of April, the average price for all grades of gasoline for the month was \$3.85, which was up from February's average of \$3.26 a gallon. Compared to February 2010, average

gasoline prices were up 20.7% from \$2.70 a gallon. The April average price compared to February a year ago has risen 42.6%. Clearly consumers are being forced to adjust their spending and driving habits. Last Friday, the average nationwide gasoline price was \$3.99 a gallon.

The analysis showed that GM’s dealers’ lots were largely packed with gas-guzzlers

The Wall Street Journal worked with *Truecar.com*, an automobile buying web site, to examine the availability of fuel-efficient cars from GM as of the end of February. The analysis showed that GM’s dealers’ lots were largely packed with gas-guzzlers and not the fuel-efficient vehicles the public wants.

Exhibit 10. GM Must Revamp Output To Meet Fuel Standard



Source: WSJ, PPHB

We still believe the game plan of the Obama administration is to force auto manufacturers to have to cut back their sales of less fuel-efficient vehicles and force customers to buy electric and hybrid cars to meet the company’s overall fleet mileage standard

The result of *The Wall Street Journal’s* analysis was that GM will need to sell a lot more of its fuel-efficient vehicles if it wants to get its fleet sales to a 30-miles-per-gallon (mpg) average. As the chart in Exhibit 10 demonstrates, the blue bars reflect the actual percentage of February car sales by vehicle type while the red bars show what the percentage of sales would need to be to achieve the 30-mpg average for the entire fleet. While we know the economics of car manufacturing at GM have improved due to the bankruptcy and reduction in many of its burdensome labor-related expenses, we still suspect big cars are more profitable than small ones. The problem, as shown across the bottom of the chart, is that small cars are the more fuel-efficient and will be important in meeting the higher fuel-efficiency standard. You will note there was no category for electric cars. We still believe the game plan of the Obama administration is to force auto manufacturers to have to cut back their sales of less fuel-efficient vehicles and force customers to buy electric and hybrid cars to meet the company’s overall fleet mileage standard.

Is The China Energy Growth Machine Slowing Down?

At the root of any country’s energy needs are its demographic

China's population growth rate, however, was the slowest in nearly half a century

trends. At the end of April, the National Bureau of Statistics of China released its population census as of the end of 2010 showing that the country had a total of 1.34 billion people, up 73.9 million, or 5.8% from the 2000 tally. The decade's growth of nearly 75 million exceeds the total population of Great Britain.

China's population is below the 1.4 billion that United Nations demographers projected when the count was being conducted last November. The country's growth rate, however, was the slowest in nearly half a century. China's very first census survey was taken in 1953 and showed the country had 594 million people. Buried within the wealth of statistics about China's population in this census were several key trends with social and economic ramifications that may impact the country's future energy demand.

This low 1.4 fertility rate compares to China's four births per mother in 1970

The population growth rate has slowed appreciably from a 1.07% annual rate during 1991-2000 to only 0.57% in this last decade. While there was no fertility rate determination yet, the data suggests a rate of about 1.4 children per woman, considerably less than the 1.8 rate the government had been estimating as of 2000. This low fertility rate compares to China's four births per mother in 1970. The low fertility rate is partly the result of the government's mandated one child policy that has been in effect since 1980. Under that edict, which was adjusted in recent years, families residing in urban areas can have only one child while those in rural areas can have two.

The percent of people over 60 rose by 2.9 percentage points since 2000 to 13.3%, which was one percentage point higher than demographers had estimated

The one child policy has contributed to a widening gender gap in the country along with a rapidly aging population and a soon-to-begin-shrinking labor force. China has experienced a birth rate of 118 male newborns for every 100 females. The disparity between the sexes is due to family planning policies that encourage the abortions of female fetuses. But aging may be the biggest problem China faces going forward. The percentage of the population under the age of 15 was 16.6%, but it fell by 6.3 percentage points since 2000. On the other end of the spectrum, the percent of people over 60 rose by 2.9 percentage points since 2000 to 13.3%, which was one percentage point higher than demographers had estimated. For a country with no social safety net, the aging population and shrinking youth category will become a significant problem in the future as there will be fewer working-age people to support the older citizens and no government program to care for them.

The aging demographics of China point to a near-term peak in the growth of the labor force with significant long-term ramifications for the country's economic growth. This was pointed out by Jim Walker, managing director at Asianomics Ltd. and former chief economist at CLSA Asia-Pacific Markets. He stated, "The working age population is due to start falling within the next three or four years. These nine, 10 percent growth rates people have become accustomed to are not sustainable for very much longer." This scenario has been described by others as: "China will get older before it gets richer."

The census showed 49.7% of the population lives in urban areas up from 36.1% in 2000 and 26.2% in 1990

Another point from the China census was the mobility of its labor force and its location. For the first time, the survey questioned people about where they resided at the time of the survey versus where the household registration process indicated their home was located. The outcome was the identification of 261.4 million migrant workers with more than 220 million having worked away from their home for more than six consecutive months, and nearly half of the number estimated to have come from rural to urban locations while the balance moved between urban areas. These rural migrants have contributed to the increasing urbanization of China as the new census showed 49.7% of the population lives in urban areas up from 36.1% in 2000 and 26.2% in 1990. Part of the jump in this census was due to a change in the counting to include migrants.

Exhibit 11. Political Districts In China

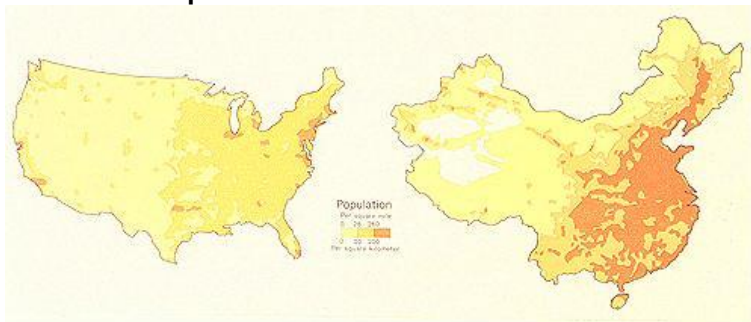


Source: *Columbia.edu*

Compared to the 2000 census, the share of the population in the eastern region of the country rose by 2.4 percentage points to 37.9%, while all other regions saw their shares decline

The top five provinces in China by population were the same as in 2000, however, the ranking of two provinces changed. The top five provinces were Guangdong (third in 2000), Shandong, Henan (first in 2000), Sichuan and Jiangsu. The National Bureau of Statistics reported that compared to the 2000 census, the share of the population in the eastern region of the country rose by 2.4 percentage points to 37.9%, while all other regions saw their shares decline. This mobility reflects the long-term trend in rural to urban migration and the significant economic growth of the coastal areas.

Exhibit 12. Populations Concentrate In Eastern Areas

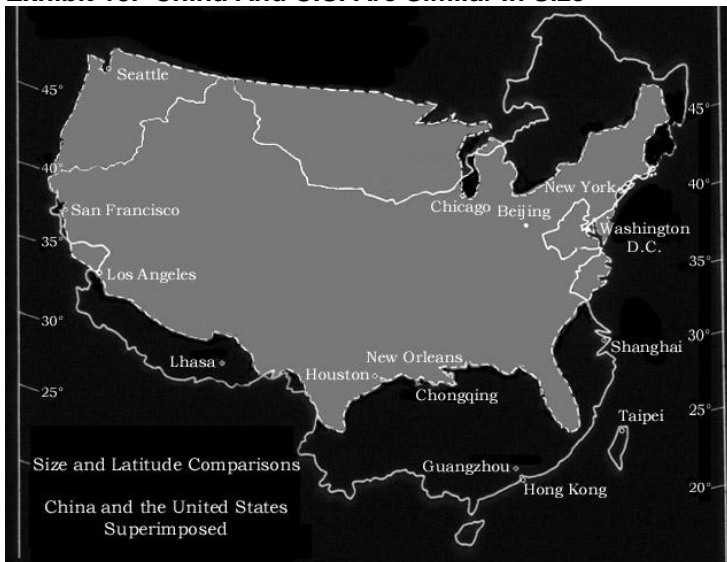


Source: *Columbia.edu*

China and the United States are similar in having population concentrations in their eastern regions

China and the United States are similar in having population concentrations in their eastern regions, which is partly tied to the distribution of farm lands and access to ports for trade. To demonstrate this point further, the chart in Exhibit 13 shows a map of China superimposed on one of the United States. The two countries are similar in size with China having 3.69 million square miles compared to the U.S.'s 3.68 million square miles.

Exhibit 13. China And U.S. Are Similar In Size



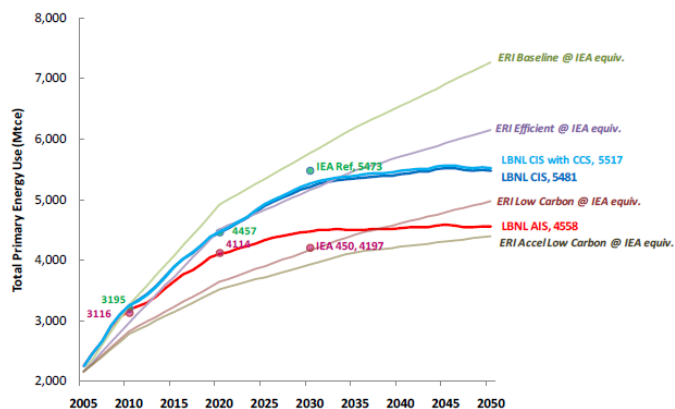
Source: *Columbia.edu*

The United States employs only about 3% of its population in farming

A major difference between China and the U.S., however, is that 40% of the latter's land can be cultivated but only 11% in China. The development of a highly mechanized and scientific agricultural sector in the U.S. means that even with 80% more farmland than China, which translates into 10-times more farmland per capita, the United States employs only about 3% of its population in farming. The U.S. is also one of the leading agricultural exporting countries.

aggressive effort to improve energy efficiency in contrast to the more modest targets in the CIS plan. Energy demand under each scenario is built from the bottom up, which is much more time and labor intensive. The study has been underway for four years in order to examine the energy demand relationships.

Exhibit 15. Study Sees Less Energy Demand In China



Note: AIS is Accelerated Improvement Scenario, CIS is Continued Improvement Scenario, IEA Equiv. refers to converting ERI's numbers to IEA equivalent given that ERI follows the convention of using power generation equivalent, rather than IEA and LBNL's use of calorific equivalent, to convert primary electricity. This results in a 3.01 lower gross energy content for renewables and biomass.

Figure ES-1: Primary Energy Consumption in Different Scenarios
Source: Berkeley Lab

If China could achieve the AIS goals, the projected energy consumption in 2050 is nearly half the ERI Baseline forecast

The more conservative CIS forecast projects China's energy consumption rates to begin to slow in 2030 in contrast to the AIS estimate that sees the slowing starting in 2025. By the end of the forecast period, 2050, the AIS projects the country's energy demand to be 20% below the CIS projection. The significance of the lower demand forecast can be seen by the chart in Exhibit 15 showing the two Berkeley Lab projections and various Energy Research Institute (ERI) and IEA forecasts. When looking at the CIS forecast compared to the ERI Baseline projection, the differences are meaningful initially and become very significant in later years. If China could achieve the AIS goals, the projected energy consumption in 2050 is nearly half the ERI Baseline forecast.

While we doubt that China will meet the AIS energy demand assumptions, the latest census data suggests that the country's growth rate may be peaking. If correct, there will be energy demand implications; we just don't know how significant they will be.

The Promise Of Green Jobs Is More Elusive Than Advertised

The Obama administration remains convinced that its energy policy should encourage and sponsor renewable energy sources, not only because they offer clean energy alternatives but because they also promise job creation, something the government is having trouble stimulating. The presumed benefits from green energy investing

Green jobs are “jobs that are saved or created by policies that will shift our economy toward greater sustainability”

and job creation have also moved north to Canada. A new study published by the Frontier Centre for Public Policy, an independent, non-profit organization that does research in support of economic growth and social outcomes, focuses on the failure of numerous European government green energy and job initiatives in questioning the Canadian efforts.

The study’s authors begin by defining green jobs by utilizing a description from a joint report by the Sierra Club, Greenpeace and the Alberta Federation of Labour that green jobs are “jobs that are saved or created by policies that will shift our economy toward greater sustainability.” According to the Frontier study, “green jobs are jobs that are created when governments put environmental regulations, subsidies, and programs in place; these jobs would not be created in the absence of these policies.” The study went on to review a number of governmental and environmental organization proposals employing “green stimulus” efforts that would create jobs.

They point out that government subsidies for some industries do little but raise the costs for others

The authors make the statement, “Among economists, it is well understood that governments do not create jobs; the willingness of entrepreneurs to invest their capital, paired with consumer demand for goods and services does.” They point out that government subsidies for some industries do little but raise the costs for others. It is the distortion among industries that is often overlooked by promoters of “green stimulus” programs. To demonstrate this conclusion, the authors reviewed the history of green energy and green job programs in Spain, Italy, Germany, Denmark, the United Kingdom and the Netherlands. In each country, these green programs have proven less successful than proponents suggest because the loss of other jobs and the program’s cost for consumers create economic distortions.

The study calculated that the effort had destroyed 110,500 jobs in the country, or 2.2 jobs for every “green job” created

A report issued in March 2009 by researchers Gabriel Calzada Álvarez and colleagues at the Universidad Rey Juan Carlos calculated that since 2000 Spain had spent \$791,597 to create each “green job” including subsidies of more than \$1.38 million per wind industry job. Moreover, the study calculated that the effort had destroyed 110,500 jobs in the country, or 2.2 jobs for every “green job” created. The report was roundly criticized by environmentalists who claimed it had been funded by the oil industry, which proved not to be the case. But a subsequently leaked Spanish government report, while not completely confirming the study’s numbers, actually arrived at a potentially greater job-loss number. The leaked report was prepared for the leaders of the government and concluded that the subsidies for “green jobs” needed to cease before Spain suffered the same financial fate as Greece.

The Spanish report was followed by one in Italy prepared by two researchers at the Bruno Leoni Institute that concluded that for “the same amount of capital that creates one job in the green sector, would create 6.9 or 4.8 if invested in the industry [industrial sector]

The implementation of these “green energy” mandates has raised the cost of power for German residents by roughly 7.5%

Rather than generating 20% of the country’s electricity, intermittent wind power generates as little as 5% of the country’s annual electricity consumption and averaged 9.7% over the prior five years

The report’s key finding was that for every job created in the renewable energy industry, 2.7 jobs were lost

or the economy in general, respectively.” The study’s authors also concluded that even though the government can create jobs in the “green economy,” probably at least 60% of them would be temporary in nature and disappear after the project they were associated with was completed.

The state of “green jobs” in Germany has been helped by the passage of a feed-in law requiring utilities to buy solar power at a rate of \$0.59 per kilowatt hour. That rate is far above the rate for conventional power, which was between three and ten cents per kilowatt-hour. The implementation of these “green energy” mandates has raised the cost of power for German residents by roughly 7.5%. As a result of this inflated power cost, the German government last spring elected to reduce the subsidy for domestic roof-top solar photovoltaic systems by 16% and for stand-alone systems by 15%.

The perennial example of the potential role for wind energy is Denmark. The massive wind farms, which are now being constructed offshore due to the complaints of local residents, supposedly account for 20% of Denmark’s electric power according to wind power proponents. In a 2009 report by CEPOS, a Danish think-tank, entitled “Wind Energy, The Case of Denmark” found that rather than generating 20% of the country’s electricity, intermittent wind power generates as little as 5% of the country’s annual electricity consumption and averaged 9.7% over the prior five years.

The critical variable in Denmark’s wind power case is the role of its neighbors Norway and Sweden that provide Denmark with rapid access to significant amounts of hydro-electric power through interconnectors. Over the past eight years, West Denmark has exported an average of 57% of the wind power it generated while East Denmark averaged 45%. This exported wind power in effect is “stored” in the lakes in Norway and Sweden. These neighbors act as “storage batteries” for Denmark’s highly variable wind power.

One of the side notes to this interconnected power market is that Danish citizens pay the highest electricity rates in the European Union and there is little greenhouse emission benefits since the exported wind power replaces “clean” hydro-electric power.

A recent study conducted by economics consultant, Verso Economics, claims that the United Kingdom and Scotland have fared no better than the countries cited above in their quest for the creation of “green jobs.” The methodology of the Verso study is considered superior to the Spanish and Italian studies because it uses input/output tables to estimate the number of jobs forgone in the UK in favor of “green jobs” created through government subsidies. The report’s key finding was that for every job created in the renewable energy industry, 2.7 jobs were lost. In Scotland, there is no net benefit and possibly a small net loss of jobs.

The conclusion was that the policy to promote renewable energy in the UK had an opportunity cost of 10,000 jobs and 1,200 jobs in Scotland

In the UK and Scotland, the Renewables Obligation, which effectively raises the cost of electricity from renewable sources, the study concluded that it cost UK consumers \$1.75 billion in 2009-2010 and around \$159 million in Scotland. Verso used the Scottish Government's own macroeconomic model for the country to assess the impact of these costs on jobs. The conclusion was that the policy to promote renewable energy in the UK had an opportunity cost of 10,000 jobs and 1,200 jobs in Scotland.

The power output from some UK wind farms was not only zero, but the turbines had to be heated to prevent them from freezing up thus producing a negative power contribution to the grid

Another lesson learned from the UK and Scottish wind power efforts in contrast to those in Southern European countries is that turbines freeze in the winter and require power to heat them to avoid that problem. An article in the UK's *Daily Mail* reported that last winter there were days when the power output from some UK wind farms was not only zero, but that the turbines had to be heated to prevent them from freezing up thus producing a negative power contribution to the grid. This phenomenon had been observed in a wind farm in northern New Brunswick and reported on by the *Telegraph-Journal* in February 2001.

As of September, only about \$20 billion of the allotted funds had actually been disbursed, the slowest rate for any category at the time

Despite the claims of politicians and Obama administration officials about the benefits of green energy investments in creating new jobs, we have yet to find a study that demonstrates that fact. We suspect there is a study somewhere that supports the case for green jobs, but it is probably built on numerous assumptions with weak foundations. None of this has dissuaded the Obama administration from lavishing money on clean energy companies and projects. Last fall, an article in *The Washington Times* reported that about 11% (\$92 billion) of the original \$814 billion stimulus funds pushed through Congress in early 2009 were targeted for renewable energy projects. As of September, only about \$20 billion of the allotted funds had actually been disbursed, the slowest rate for any category at the time. The White House was claiming at that time that green funding had created 190,700 jobs, a figure about which private analysts were highly skeptical. The Department of Energy estimated that 82,000 jobs had been created and it acknowledged that as much as 80% of some of the green funding programs had gone to foreign firms employing workers in countries such as China, South Korea and Spain, rather than in the U.S.

11 U.S. wind farms used their grants to purchase 695 out of 982 wind turbines from overseas suppliers

A report by American University's Investigative Reporting Workshop found that 11 U.S. wind farms used their grants to purchase 695 out of 982 wind turbines from overseas suppliers. This situation is getting worse as foreign countries cut back their green subsidies and the manufacturers in their countries began competing for work around the world. That is not encouraging for the promotion of U.S. "green jobs" from our government's subsidies.

Much like how the U.S. economy is fading this spring as government stimulus dries up, we suspect many of the clean energy businesses and markets also will suffer as budget restrictions go into place. But

as a wise man once said: "An industry cannot be viable if it is dependent on government mandates or subsidies for its existence." Today, this is clearly the case for most green energy businesses.

Will My Visibility Be Compromised By Wind Turbines?

A problem arose when, after consulting experts on wind turbine zoning laws around the Northeast, the commission ignored those recommendations and wrote a zoning law with standards that fit this particular proposal

We have been following the effort of a real estate developer to promote the installation of twin wind turbines in Charlestown, Rhode Island, where our second home is located. The effort began about two years ago with a move to get certain town council and zoning commission members to create a zoning rule specifying the standard to be met to secure approval for wind turbine construction in the town. A problem arose when, after consulting experts on wind turbine zoning laws around the Northeast, the commission ignored those recommendations and wrote a zoning law with standards that fit this particular proposal. The outrage in the town led to a rejection of some of these officials in the latest municipal election. Approval of this project is still under consideration.

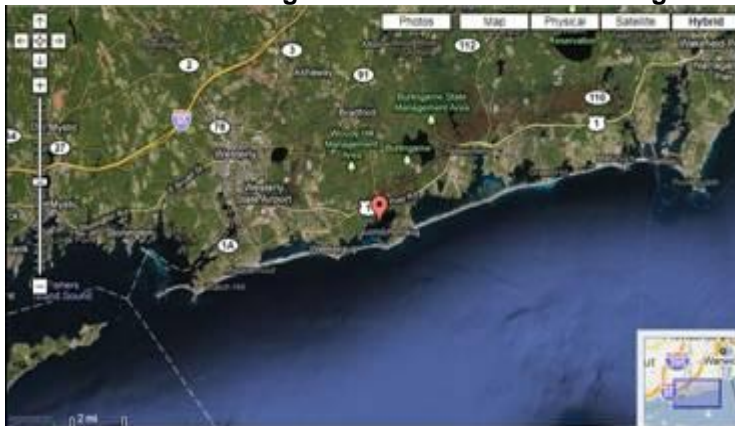
Exhibit 16. Cell Tower Will Be Dwarfed By Turbines



Source: Charlestown Citizens Alliance

In the background is a cell phone tower located along Route U.S. 1 that stands 125-feet tall

We received a photo in a local newsletter that pointed out the potential visual problem for both local residents and drivers passing through town. Charlestown is a rural community with numerous lakes, saltwater ponds and municipal and state parks. The picture in Exhibit 16 shows a view taken from a hiking path in the state's Burlingame Park. The view is looking north across Watchaug Pond toward the Burlingame Park picnic area. In the background is a cell phone tower located along Route U.S. 1 that stands 125-feet tall. The writer who submitted the picture was horrified with the prospect of what the view will be when the two wind turbines proposed by Whalerock Capital Partners are installed. The two turbines are supposed to have a 200-foot maximum blade height, although officials may allow a 250-foot height if needed to access wind. That would be twice the height of the cell phone tower.

Exhibit 17. Positioning Wind Turbines Is A Challenge

Source: Google Maps

While we cannot see the cell phone tower from our home, when we are out on Quonochontaug Pond we can see the tower from certain locations. To gain a prospective on the towers, we have included a map of the area from Google Maps. The photo was taken from the right of the pond under the Burlingame label. The cell phone tower is on the straight line between the Burlingame marker and the site of the Westerly Airport. The tower is along Route 1 just past the 'V' in the road. Our home is on the edge of Quonochontaug Pond about where the orange marker is positioned.

They are reluctant, however, to embrace them being positioned in their neighborhood, nor are they willing to pay the cost through substantially higher electricity costs

The proposed wind turbines are to be installed on property way to the right of Burlingame Park, so it is impossible for me to know whether I will be able to see the tops of the wind turbines. What I am sure of is that many citizens, after seeing the photo of the cell phone tower, will be more upset about the potential of this property receiving the zoning permit allowing the installation of the two wind turbines. Just like the Cape Wind project in Nantucket Sound and the demonstration wind farm off Rhode Island's Block Island, New Englanders embrace "clean" wind power. They are reluctant, however, to embrace them being positioned in their neighborhood, nor are they willing to pay the cost through substantially higher electricity costs. NIMBY is alive and well in Rhode Island.

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