PPHB
ENERGY INVESTMENT BANKING

MUSINGS FROM THE OIL PATCH

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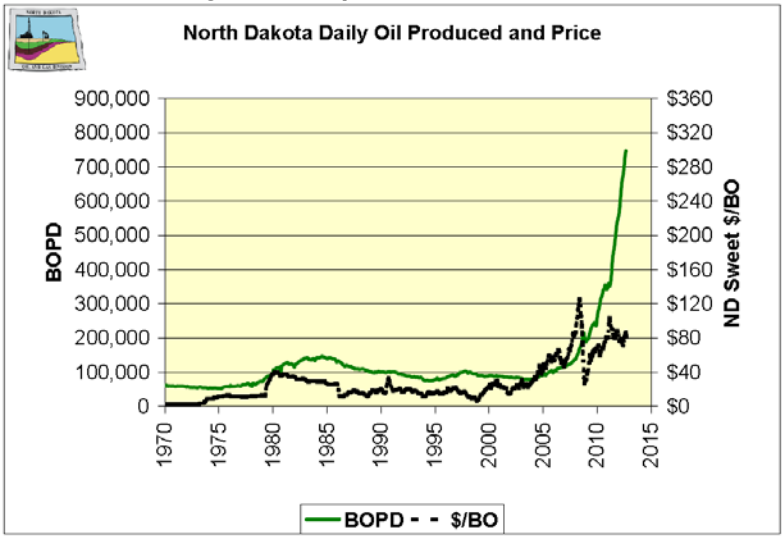
Note: *Musings from the Oil Patch reflects an eclectic collection of stories and analyses dealing with issues and developments within the energy industry that I feel have potentially significant implications for executives operating and planning for the future. The newsletter is published every two weeks,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

PwC Says Shale Oil "The Next Energy Revolution" – Really?

We have been thinking about the implications of the growth in output from unconventional oil and gas plays on the energy business

Economists with the worldwide accounting firm of PricewaterhouseCoopers LLP (PwC) have just published an interesting and thought-provoking analysis of the long-term impact of shale oil on the global economy. While one might question some of the shale oil production numbers that evolve from the PwC analysis, the final couple of pages of the report, which focus on "opportunities and challenges for governments and companies" and touch on topics we have been devoting significant thought to with respect to the implications of the growth in output from unconventional oil and gas plays, is what we found most intriguing.

Exhibit 1. ND Tight Oil Output Soars

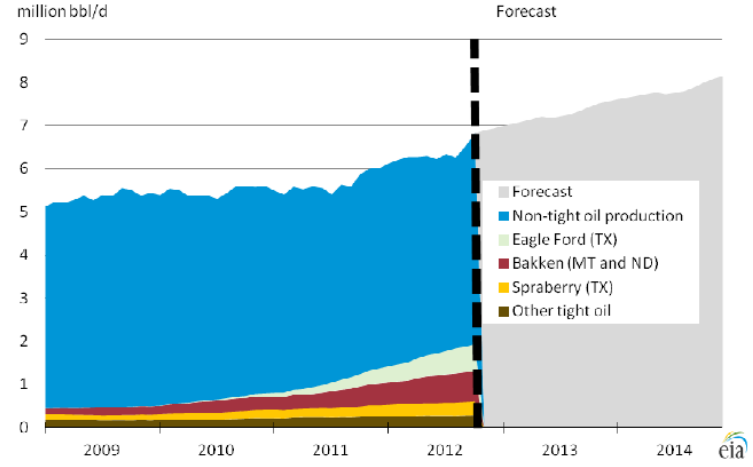


Source: North Dakota State Industrial Commission

The EIA is calling for an increase in tight oil output between November 2012 and December 2014 of 1.13 million b/d, or nearly all of the projected total U.S. crude oil production increase

PwC begins its report with a brief review of the history to date of shale oil and shale gas in the United States. The economists point out that shale oil production has grown from 111,000 barrels per day (b/d) in 2004 to 553,000 b/d in 2011, or an annual growth rate of 26%, albeit starting from a very small base. We know shale oil production increased further in 2012. The oil production increase in North Dakota alone, where the Bakken tight oil formation dominates the output, rose by 233,805 b/d last year. Furthermore, the Energy Information Administration (EIA), in its supplemental information supporting its latest Short Term Energy Outlook (STEO), is calling for an increase in tight oil output between November 2012 and December 2014 of 1.13 million b/d, or nearly all of the projected total U.S. crude oil production increase during this period of 1.26 million b/d.

Exhibit 2. Tight Oil Output Growth Accelerating



Source: Tight oil production estimated by U.S. Energy Information Administration (EIA) analysis of data from DrillingInfo, through August 2012, U.S. total oil production through November 2012 from EIA, EIA forecast through 2014.

Source: EIA

The EIA is estimating that U.S. shale oil production will grow at a much slower rate in the future than in the past, but it will reach 1.2 million b/d of output by 2035, or 12% of the nation's projected oil supply

This optimistic outlook for tight oil production is driven both by the technical success producers are having in extracting the output and the high global price of oil. These two factors have contributed to the EIA estimating that the shale oil resources in this country have increased from 4 billion barrels in 2007 to 33 billion barrels in 2010, and we suspect the estimate will go higher when the next estimate is released. PwC says the EIA is estimating that U.S. shale oil production will grow at a much slower rate in the future than in the past, but it will reach 1.2 million b/d of output by 2035, or 12% of the nation's projected oil supply. They comment that this projection may be conservative given that other analysts are forecasting tight oil production to reach upwards of 3-4 million b/d by 2035. PwC believes that tight oil production will make the largest contribution to total U.S. oil supply growth by 2020, which would be consistent with the EIA's outlook in its latest STEO cited above. The implication of this forecast is that increased shale oil production will displace a

significant volume of waterborne crude oil imports to the U.S., estimated to be potentially as much as a 35-40% decline.

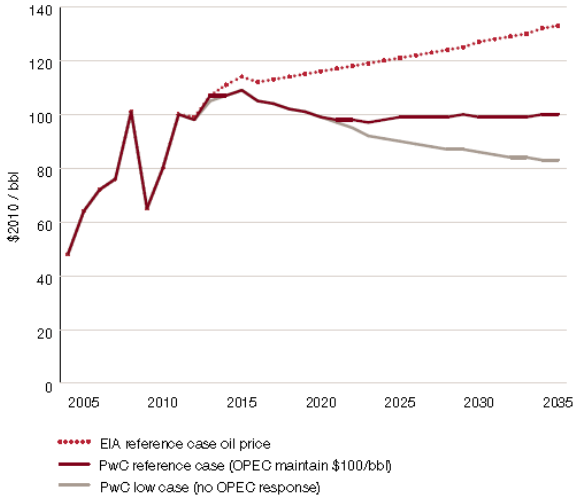
The EIA estimates oil prices will reach $133 per barrel in real terms by 2035

In PwC's view, this scenario could lead to future oil prices being significantly lower than projected in current forecasts. Just how much lower the price might be becomes an interesting exercise in forecasting the global growth in shale oil production and the reaction of the leading conventional oil producers – primarily OPEC members. At the present time, the EIA estimates oil prices will reach $133 per barrel in real terms by 2035, which is a higher projected price than the International Energy Agency (IEA) forecasts, which is $127 per barrel.

PwC believes that global estimates of shale oil resources will be revised upwards significantly over time. That belief is based on the past pattern of shale oil and shale gas resource estimate changes in the United States. As a result, PwC believes that "global shale oil production has the potential to rise to up to 14 million barrels of oil per day by 2035," which would represent approximately 12% of global oil supply then. This production growth will have an impact on global oil prices according to PwC, depending on how OPEC members and Russia respond. PwC has developed two scenarios for predicting future oil prices – one that allows for OPEC to respond by lowering its output and the other with no OPEC response. In the former scenario, PwC sees the global oil price maintaining an average price of around $100 per barrel in real terms, while in the latter case it falls to $83 per barrel. Based on these two scenarios, PwC sees the potential for future global oil prices to be $33-50 per barrel lower than the EIA's reference case of $133 per barrel in 2035, in real terms. This reduced oil price is significant and raises numerous questions for governments and companies, while also creating significant opportunities and challenges.

Based on these two scenarios, PwC sees the potential for future global oil prices to be $33-50 per barrel lower than the EIA's reference case of $133 per barrel in 2035, in real terms

Exhibit 3. Oil Prices Could Fall Significantly

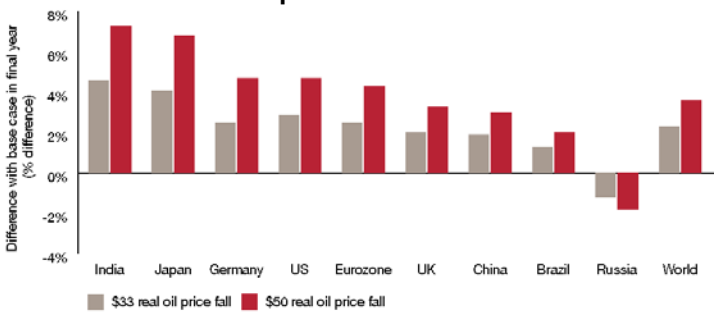


Source: PwC

There could be "an increase in size of the global economy of around $1.7-2.7 trillion per annum

By using the National Institute Global Econometric Model, PwC attempts to project the impact of its two price scenarios (a decline of $33 or $50 per barrel in real oil prices) on global economic activity. They conclude that at today's Gross Domestic Product (GDP) values, there could be "an increase in size of the global economy of around $1.7-2.7 trillion per annum. This could imply a rise by 2035 in average global GDP per person of between $230 and $370 per annum (at today's prices) relative to the EIA baseline case with minimal shale oil production." If the PwC price outlook proves correct, there will be a significant positive impact on future global economic activity and the wealth of various countries.

Exhibit 4. Oil Price Impact On GDP Growth

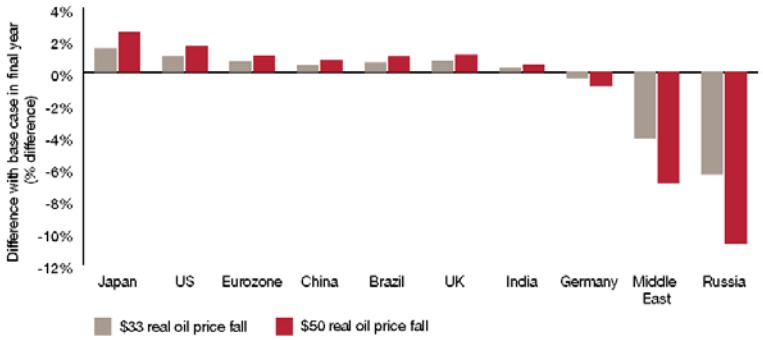


Source: PwC

OPEC member countries and Russia could experience deterioration in their current account balances due to the lower oil price

The economic model's results suggest that India and Japan could each see an increase in their GDP of between 4% and 7% by the end of the projection period. PwC sees other net oil importers such as the United States, China, Germany and the UK gaining between 2% and 5% in GDP over the period. On the other hand, OPEC member countries and Russia could experience deterioration in their current account balances due to the lower oil price. PwC points out, however, that the financial damage lower oil prices might cause for Russia could be offset if the country elects to exploit its large estimated shale oil resources. That would certainly favor ExxonMobil (XOM-NYSE) given its growing relationship with Russia's Rosneft Oil Company (RNFTF-PNK).

Exhibit 5. Price Impact On Current Account Balance



Source: PwC

In the conclusion to its report, PwC briefly explores some of the implications growing global shale oil production will have on energy markets, energy companies and governments. It is the positive implications, on balance, from growing shale resource exploitation that gives us increased confidence that the long-term outlook for the United States will be positive, despite near-term domestic economic and political fears and growing concerns over the future geopolitical outlook. The magnitude of our optimism is likely to be shaded by the political, geopolitical and economic policies and actions of our leaders, but we don't doubt that the United States will reach the next decade in a surprisingly stronger relative position than most prognostications suggest today.

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Given PwC's belief in the potential for significant oil shale production and resulting lower future oil prices, the firm's economists say that the financial case for renewables becomes relatively less attractive. There is little doubt about that reality, but the argument for developing renewable energy projects has rarely been about their financial viability, but rather about the social responsibility from building them. To the extent that government mandates for greater investment in renewable energy projects increases, then the nation's future economy could be somewhat smaller as energy capital could be misdirected into investments that are uneconomic and have a greater likelihood of being abandoned in the future much like the wind farms built during the 1980s in California.

The argument for developing renewable energy projects has rarely been about their financial viability, but rather about the social responsibility from building them

Lower oil prices will also impact the pace of development of more expensive and less environmentally attractive oil supplies such as Arctic and oil sands resources. While these two resources currently are being attacked on environmental grounds, their vulnerability to low returns on capital investment may be what actually curtails their future development. Given this trend, oil companies will need to reassess their current portfolios against lower future oil prices. This reassessment may become a catalyst for accelerated merger and acquisition activity as large, integrated oil companies target undervalued, financially challenged smaller oil and gas companies possessing attractive resource holdings. The lower cost of capital and greater financial resources to withstand periods of increased commodity price volatility, coupled with greater R&D capabilities to reduce finding and development costs gives the large, integrated oil companies a significant competitive advantage.

This reassessment may become a catalyst for accelerated merger and acquisition activity

Companies that are targeting offshore oil and gas developments exclusively may find a need to seek diversification of focus. That goes for both oil and gas producers and oilfield service companies. Here again, M&A activity may be the easiest and fastest way for single-purpose entities to become more broadly diversified. In the same vein, the governments of OPEC members and other net oil and gas exporters may need to reassess the impact on their budgets of reduced oil prices and possibly lower oil production. While there always remains the possibility that reduced oil prices will stimulate

M&A activity may be the easiest and fastest way for single-purpose entities to become more broadly diversified

greater oil consumption in the future, the changing demographics of the global population and recent legislative initiatives to reduce energy consumption will bake into the future energy outlook a flattish energy demand growth profile.

The belief in the potential of abundant natural gas supplies and thus cheap feedstock costs is leading to a revival of the domestic petrochemical industry and the emergence of a nascent liquefied natural gas exporting business

The big winners in the PwC scenarios are those companies and industries that use oil and its by-products in their own output. Lower energy prices have already produced a resurgence of on-shoring previously exported businesses. Changing demographics in historically cheap labor markets such as China and Asia has led to U.S. manufacturing companies restarting domestic production of capital equipment and durable goods. Importantly, the belief in the potential of abundant natural gas supplies and thus cheap feedstock costs is leading to a revival of the domestic petrochemical industry and the emergence of a nascent liquefied natural gas exporting business. As it took decades for these companies to abandon the rapidly growing high-cost energy environment that characterized the U.S. during the latter part of the last century and the early years of the current one, manufacturers will not be quick to shift out of the U.S. at the first uptick in energy costs as they perceive that our nation has built a long-term global competitive cost advantage.

At some point in the distant future, we anticipate looking backwards and marveling at how resilient the U.S. economy proved to be and how it overcame the many dire predictions of its demise due to the idiotic political and economic actions of our rulers

So while we rail against the destructive economic and political decisions being made in our seats of government today, we see an opportunity for the domestic GDP pie to be larger in the future; just how much larger will be determined by the decisions of politicians in the near-term. At some point in the distant future, we anticipate looking backwards and marveling at how resilient the U.S. economy proved to be and how it overcame the many dire predictions of its demise due to the idiotic political and economic actions of our rulers. We will probably wind up tipping our hat to the benefits created by the great American shale revolution begun by the son of Greek immigrant parents from Galveston, Texas – George Mitchell. While many people would call him a true entrepreneur, and he was/is, based on our encounters with him, we would say he was more like Nellie from *South Pacific* fame that Rodgers and Hammerstein deemed “A Cockeyed Optimist.”

Is The End Of The Chinese Economic Miracle In Sight?

Export growth and capital investment statistics have shown positive trends suggesting that the economic slowdown experienced by the country may be ending

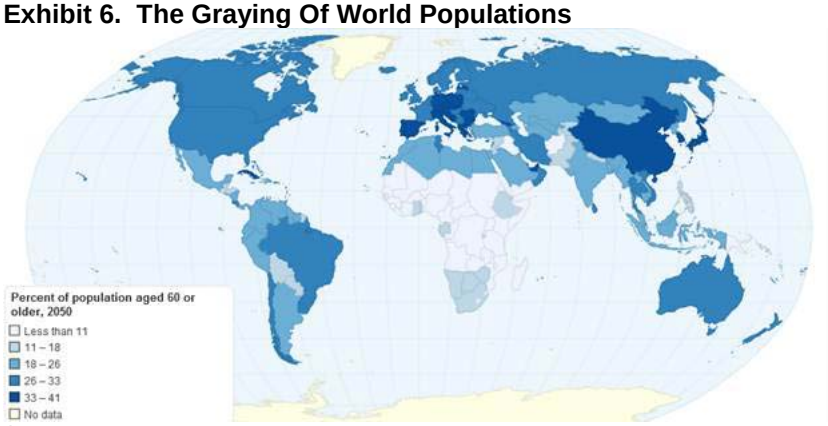
Recently, global oil prices have strengthened, largely on the back of more positive economic statistics from the world’s second largest economy – China. Export growth and capital investment statistics have shown positive trends suggesting that the economic slowdown experienced by the country may be ending and more historical economic growth rates are returning. In fact, Standard Chartered Bank (SCBFF-Nasdaq) economists have recently upgraded their forecast for China’s growth rate to 8.3% this year and 8.2% next, although other estimates for 2014 are much lower. This upwardly-revised estimate is meaningfully better than the government’s official

projection calling for 7.5% growth in 2013. While this may be good news for China and the global economy, a new paper from researchers at the International Monetary Fund (IMF) suggests the country's economic miracle may be about to end.

The surplus labor situation will disappear after 2020 and within a decade after that China will face a labor shortage of almost 140 million workers

This new paper chronicles a demographic trend that has not received much attention from economists but which portends serious labor shortages for the country in coming years. The paper, "Chronicle of a Decline Foretold: Has China Reached the Lewis Turning Point?" says that the army of Chinese peasants looking for work peaked in 2010 at around 150 million. That number is now collapsing. The surplus labor situation will disappear after 2020 and within a decade after that China will face a labor shortage of almost 140 million workers. According to the IMF, "This will have far-reaching implications for both China and the rest of the world." No doubt.

Exhibit 6. The Graying Of World Populations



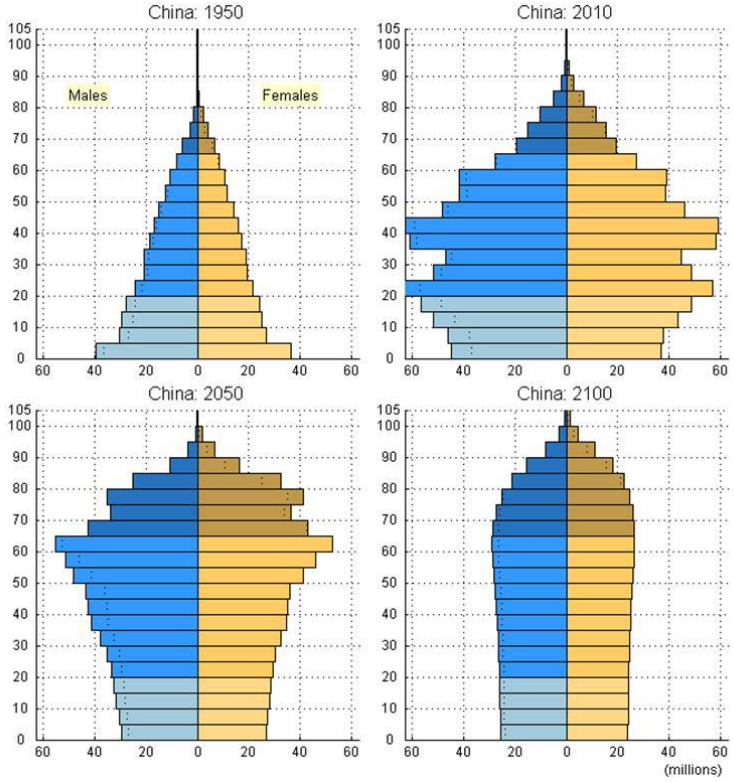
Source: UN

In China's case, its massive labor surplus of farm workers migrating to the coastal cities with their manufacturing jobs has powered the Chinese economic miracle for the past several decades

It was only about half a dozen years ago that a Chinese demographer shocked his audience at the World Economic Forum in Davos with the warning that his country might have to resort to mass suicide in the end, having to push pensioners out on their own. He was describing the demographic problem of too many old people to be supported by a rapidly shrinking younger, productive population. The graying of the world is quickly becoming a topic of increased interest and importance for understanding which economies on the planet will thrive and which ones will shrivel up. In China's case, its massive labor surplus of farm workers migrating to the coastal cities with their manufacturing jobs has powered the Chinese economic miracle for the past several decades. This cheap labor was the raw material of the Chinese manufacturing sweatshops and the low cost of manufacturing drove the country's economy. This labor force migration was carefully regulated by the societal and governmental structure of the country in order to keep the migrants' families tied to their villages and hopefully keeping a lid on social unrest. The problem now is that the government's one-child policy and the

populations' low fertilization rates are baked into the country's demographic and it will take nearly a half a century to turn around this shift in the labor pool.

Exhibit 7. Changing China Demographics



Source: UN Population Division

The Boston Consulting Group reports that "productivity-adjusted wages" were equal to 22% of U.S. levels in 2005, but they will reach 43% by 2015

The IMF paper points to the challenge of the Chinese economy as it meets its Lewis Point. The Lewis Point is named after St. Lucia's Nobel laureate economist Sir Arthur Lewis. The turning point marks when the supply of migrant laborers dries up and city wages soar. In effect, labor turns the tables on capital and the end result is that profits crash. The Boston Consulting Group reports that "productivity-adjusted wages" were equal to 22% of U.S. levels in 2005, but they will reach 43% by 2015. By that time, Chinese wages will reach 61% of wages in the American southern tier states, the region where manufacturing growth has been the most rapid in recent years. It supposedly is this turning point in China's labor market that has led a number of America's leading manufacturing companies to begin "on-shoring" manufacturing jobs. The phenomenon is being helped also by cheap energy from the shale revolution, a weaker U.S. dollar and lower shipping costs.

The Lewis Point is a critical point in the development of economies. It is when developing economies no longer can rely on cheap labor, copied technology and export-led initiatives to drive their growth.

The list is long of countries that through their history reached the Lewis Point and succumbed to failure

Instead, they need to evolve into economies driven by the rule of law and the free flow of ideas. Unless they evolve, they are likely doomed to fall into the "middle-income trap," and most do. The list is long of countries that through their history reached the Lewis Point and succumbed to failure – the Soviet Union, the Philippines in the 1950s, most of the Middle East and much of Latin America in the 1960s and 1970s. The jury is still out on whether Argentina and Brazil can avoid falling into the middle-income trap. And certainly we don't know yet where China is headed.

According to some economists, "investment" made up 55% of all growth in 2012, and it may soon need to reach 60% in order to help keep up the pace of growth

The Chinese government is attempting to revive its slowing economic growth by turning on the credit spigot. Railway investment almost doubled in the second half of last year. The government recently has pledged $2 trillion of stimulus spending to help pump up growth. What this credit growth looks like is a reversion to the economic stimulus of earlier periods, which means more steel and cement. According to some economists, "investment" made up 55% of all growth in 2012, and it may soon need to reach 60% in order to help keep up the pace of growth. Economists call this pattern of growth stimulus a giant Ponzi scheme with a bad outcome. What is not seen, however, is that the center of the investment-driven growth is moving westward into the interior of the country and the Upper Yangtze and away from the coastal areas.

The growth is being financed by the rapid expansion of Chinese bank balance sheets that had been growing by 30% of GDP per year since 2008 and are still growing at 20% a year now

If you read various articles on the interior's new growth you learn about the construction of the world's tallest buildings and those being built in record time. It is this ramp up in growth in the interior that is driving the recently upwardly-revised Chinese economic growth rate forecasts. The growth is being financed by the rapid expansion of Chinese bank balance sheets that had been growing by 30% of GDP per year since 2008 and are still growing at 20% a year now. According to Fitch Ratings, the credit rating agency, fresh credit added to the economy over the past four years has reached $14 trillion if you include shadow banking, trusts, letters of credit and offshore vehicles. This credit stimulus about equals the size of the entire U.S. commercial banking system.

With estimates that credit in China now represents 210% of GDP, far higher than any other developing economy, one has to wonder how and when the cycle ends

Fitch estimates that the output generated from each extra yuan of lending has fallen from 0.80 to 0.35. If true, it means the Chinese will need to accelerate their lending pace in order to keep the economy growing. With estimates that credit in China now represents 210% of GDP, far higher than any other developing economy, one has to wonder how and when the cycle ends. When the credit bubble pops, as all bubbles eventually do, it will probably be a result of the clash of the labor shortage and the credit expansion hangover. Is it likely to happen in the next decade? If so, China may experience the Japanese phenomenon of being forced to sell the many assets it has accumulated in recent years, and continues to acquire, at fire-sale prices. Does anyone remember Pebble Beach and Rockefeller Center?

A last gasp of investment in new buildings and infrastructure projects means a spurt in energy consumption

From the perspective of the energy industry there are two aspects of this scenario that are worthy of attention. First is the implication for energy consumption growth. A last gasp of investment in new buildings and infrastructure projects means a spurt in energy consumption, much like what was experienced in the early years of this century as China prepared for the Olympics, which caught energy forecasters flatfooted. After this last wave of investment, energy consumption growth will drop, and probably precipitously, unless the country can build a consumer-based economy.

The former scenario suggests we may be looking at higher oil, gas and even coal prices as easily recoverable resources are depleted rapidly and investment in more expensive resources is ignored, while the latter points to collapsing energy asset values

The second implication is what happens to all the global energy investments Chinese oil and gas companies have made in recent years? Will these assets be pumped dry and then discarded, or will they be dumped on the market driving down asset values as the companies engage in a wild scramble to raise cash to repay their debts? The former scenario suggests we may be looking at higher oil, gas and even coal prices as easily recoverable resources are depleted rapidly and investment in more expensive resources is ignored, while the latter points to collapsing energy asset values, which should drag down energy company share prices. If you are ExxonMobil (XOM-NYSE), Gazprom (OGZPY-PNK) or Saudi Aramco, what should your corporate strategy be? Examining their policies and investments in recent years along with what they do this year could signal how they see the China bubble ending. Our current reading suggests they see a shifting in the driver of global economic growth away from Asia and back to western economies.

Australia Is The New *Cheers* - Nobody Knows Your Name

Supposedly, her idea was that she wanted to campaign on the image of a stable government with well-planned policies

Since the last *Musings* we spent two weeks in Australia for the first time seeking to gain a better understanding of the country and its outlook. The timing of our trip proved prescient as Prime Minister Julia Gillard announced on the day we arrived she was calling for federal elections in September. This was a highly unusual move. We understand that every previous prime minister used his/her flexibility for establishing the election date within a legally defined time frame in order to minimize the number of days of the campaign to limit the time the opposition has to prepare. In this case, the prime minister established a September 14th date, a nearly 226-day campaign, which could have been limited to 31 days following the nomination of candidates. So why did she do it? Supposedly, her idea was that she wanted to campaign on the image of a stable government with well-planned policies. The logic of this decision received intense political and media scrutiny and rapidly unwound due to events that happened in the days immediately following her announcement.

Within a couple of days one of the ministers was arrested and charged with 154 counts of fraud in his official dealings. Several days later, the prime minister announced that two other ministers were resigning. Rather than presenting a picture of a stable ruling

government, it began to look more like rats abandoning a sinking ship. To further cast doubt on Prime Minister Gillard's campaign strategy, when she was questioned by the media about how people should view these developments, she questioned with alacrity the inquiry.

Economic expectations in Australia are that energy export projects – especially for liquefied natural gas (LNG) – will take up the slack from reduced mining-related capital spending

The Australian economy has been experiencing a boom driven by the explosion in commodity prices and the capital spending by mining and energy companies striving to expand their production to capitalize on the rise in demand. New natural gas, mining and coal export projects are being developed even though commodity prices have weakened in recent months. The slumping commodity boom reflects sluggish global economic activity, and especially slumping demand from China, which has led to Australian mining companies either stopping planned expansions or actually reducing production from existing mines. Economic expectations in Australia are that energy export projects – especially for liquefied natural gas (LNG) – will take up the slack from reduced mining-related capital spending. At the same time, the economic policies of the current Liberal government in Australia are coming under attack. This is the government elected on campaign promises of not enacting a carbon-tax and reducing taxes only to actually do the reverse.

The move comes just as Australia's domestic energy consumption is accelerating, but the effort to impose greater environmental standards on new energy projects will likely restrict their development and raise their cost

The latest development is that the Gillard government appears set to impose stricter environmental assessments on coal seam gas projects in New South Wales (NSW), after accusing the state of refusing adequate approval processes. The Gillard government is being pushed by an independent NSW politician to intervene in the state approval process and impose even stricter environmental standards. The move comes just as Australia's domestic energy consumption is accelerating, but the effort to impose greater environmental standards on new energy projects will likely restrict their development and raise their cost. The impetus behind this move is the concern over climate change issues and the need for Australia to reduce its carbon emissions. Opponents argue that Australia's emissions are only 1.5% of global emissions, although on a per capita basis the country ranks close to the top in the world.

Australia is projected to be one of the world's largest LNG exporters over the next five years, but thereafter the outlook is growing increasingly cloudy

What is gaining attention by the media is the growing competition for Australian natural resource exports from projects being developed elsewhere around the world. In the energy sector, the attention is focused on the recent approvals of new liquefied natural gas (LNG) export projects in Canada and the United States. Australia is projected to be one of the world's largest LNG exporters over the next five years, but thereafter the outlook is growing increasingly cloudy even though there are number of new greenfield projects being planned. The rapidly rising cost of LNG projects under construction casts a negative shadow on the economics of new LNG ventures.

An article in *The Age* newspaper discussed the impact of recently approved new North American LNG projects including Shell's (RDS.B-NYSE) LNG project in British Columbia that is co-owned by PetroChina (PTR-NYSE), Korean Gas and Mitsubishi Corp. (MSBHY-Nasdaq) on the possible future of LNG projects in Australia. Because both PetroChina and Mitsubishi Corp. are also investors in Australian projects, some analysts are questioning whether the new Canadian project represents an insurance move by these investors given the delays and sharply escalating project costs due to skilled labor shortages in the country.

After 2015, when the newly widened Panama Canal is opened, large tankers will be able to haul U.S. LNG from Gulf of Mexico export terminals to the Pacific market

Australians are also growing concerned about the increasing number of new U.S. LNG project approvals. In the past these projects would have received little attention from Australia as its LNG exports are all targeting the Pacific gas market. That market would normally only be able to receive natural gas from Alaska or the West Coast of the United States. However, after 2015, when the newly widened Panama Canal is opened, large tankers will be able to haul U.S. LNG from Gulf of Mexico export terminals to the Pacific market. That means the growing number of U.S. LNG export terminals could prove to be a greater competitive threat to Australian projects, especially since the U.S. projects will have their export volumes priced off of domestic gas prices rather than linked to global crude oil prices. That difference provides a huge price advantage for customers of U.S. LNG.

The upcoming Australian election campaign will involve battles over government spending, deficits and issues of taxation

Besides local economic issues and export industry outlooks, the upcoming Australian election campaign will involve battles over government spending, deficits and issues of taxation. In reading many of the stories about the current political landscape, we thought we were watching a re-run of the recent U.S. political campaign. That surprise ranked with the shock of Australian food prices. After the first couple of days we gave up looking at menu prices other than to see that our bills were correct.

You then go through what surprisingly seems like pre-9-11 security screening – forget the 3-ounce in one plastic quart bag rule for toiletries and the ban on liquids (water bottle) along with having to remove your shoes before going through the metal detector

Our greatest shock was with domestic air transportation. Our first domestic flight was between Sydney and Melbourne and the Sydney airport made us think we were having a beer at *Cheers*, the Boston pub made famous by the television show. From a kiosk at the Qantas (QUBSF-Nasdaq) domestic terminal you receive your boarding pass and luggage tag. You place the tag on your bag and then place it on the luggage conveyor to be weighed and sent to your plane. You then go through what surprisingly seems like pre-9-11 security screening – forget the 3-ounce in one plastic quart bag rule for toiletries and the ban on liquids (water bottle) along with having to remove your shoes before going through the metal detector. Forget the full body scanning machines; these are the normal metal detectors. Australian security is only interested in aerosols in your carry-on luggage, but we are not sure whether there is a full restriction or just the need for them to be examined. (We didn't have any to test the security system.) Your laptop computer

must be removed from your carry-on bag along with the contents of your pockets and your belt. Interestingly, laptops don't go in a separate tray, they can be mingled with your belt and pocket contents.

The biggest surprise was that no one ever asked for any identification – not when we got our boarding passes, checked our luggage, went through security or boarded the plane

The biggest surprise was that no one ever asked for any identification – not when we got our boarding passes, checked our luggage, went through security or boarded the plane. The boarding pass was screened electronically and the cabin crew inspected it again as we boarded the plane. As we went through this process, we couldn't get the words of the *Cheers'* theme song, "where nobody knows your name" out of our head. On one hand we felt liberated after going through the check-in, security and boarding procedures. On the other hand, we were uncomfortable since we are so conditioned to U.S. security procedures that we felt "out of the mainstream" of our air transportation experience.

Australia is an interesting country with a wide range of topography and interesting and friendly people. There remains a can-do attitude among the people, but we sense that some politicians are attempting to create a nanny state. Made us feel right at home.

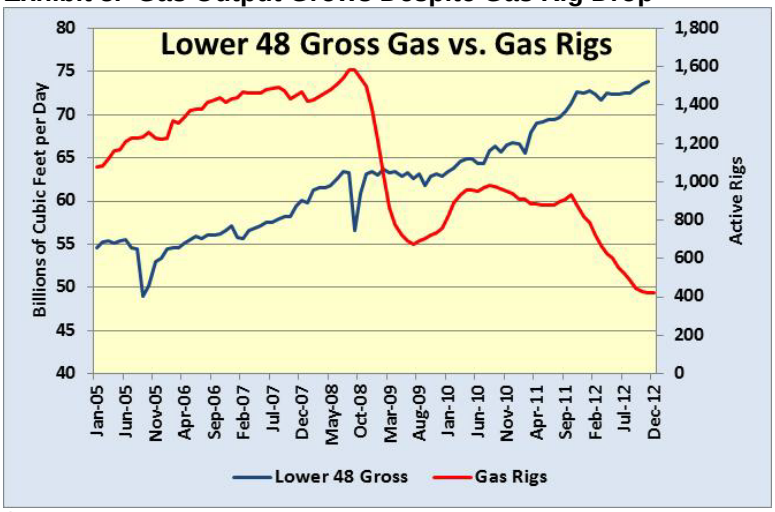
Natural Gas Output Growth Frustrating All Forecasters

It is hard to believe but just over a year ago conventional wisdom was that the growing output of natural gas from shale formations would begin to slow and eventually decline as the number of drilling rigs targeting gas wells fell. When we examine a chart of Lower 48 gross gas output (initial monthly estimates) from the start of 2005 when the EIA began publishing the results of its Form 914 monthly survey of gas production, there appears to be two steps down in rig activity but only steadily rising gas production. It wasn't until 2006 that gas production began growing as a result of the early successes in gas shale exploitation. The drilling rig count was climbing in direct response to high natural gas prices and recognition of the technical success of shale drilling. Between 2005 and 2008, as the financial crisis created liquidity problems for energy companies, gas-oriented drilling rose steadily and gas output began rising. The sharp drops in gas production experienced during this time period reflected shut-in output in the Gulf of Mexico due to hurricanes.

When the financial crisis exploded on the world economic stage in 2008 the rig count plummeted. Financial stability and credit market conditions finally stabilized along with the rig count in the middle of 2009. As a result of the violent rig count drop, natural gas production flattened out. It subsequently began rising following the upturn in the gas rig count in the last half of 2009. After climbing until mid-2010, the rig count then declined slowly before rallying in the early fall of 2011. It then plummeted again when natural gas prices collapsed due to the warm 2011/12 winter and the absence of

early hot summer weather. In recent months, the gas directed rig count has stopped falling, but natural gas output continued to rise.

Exhibit 8. Gas Output Grows Despite Gas Rig Drop



Source: EIA, PPHB

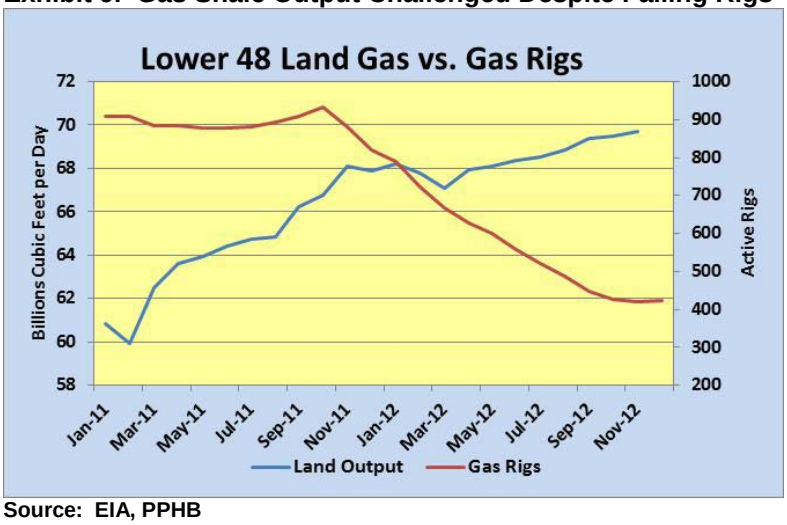
If you are concerned about the gas shale impact on the natural gas market, the production curve in Exhibit 8 fails to show that since it includes the Gulf of Mexico output, which is subject to its own dynamic set of factors including periodic shutdowns due to storms. In order to understand what is happening to gas shale output and drilling it is important to separate out of the industry production data the gas volumes coming from the Gulf of Mexico. Exhibit 9 on the next page shows the Lower 48 land gas output compared to the gas drilling rig count. We are showing the output only from 2011 as the trend in output and rig count in recent months is more important for understanding what may be happening in the gas shale sector. We are showing initial Lower 48 land output through November but the gas-oriented rig count goes through December. The rig count has declined since September 2011 but shows a flattening out in recent months and even a very slight uptick for December while gas production continues to grow. To a large degree, the continued growth in land gas production reflects the large volumes of natural gas associated with shale oil and natural gas liquids output.

To a large degree, the continued growth in land gas production reflects the large volumes of natural gas associated with shale oil and natural gas liquids output

As crude oil prices remain strong due to world oil market forces, oil-related drilling will continue to rise. Natural gas liquids prices have weakened in recent months as the pace of U.S. economic activity remains slow. Offsetting that weakness has been the slight improvement in natural gas prices as investors anticipate increased demand bringing the supply/demand balance in line. As that balance begins to be recognized, natural gas prices should push higher. If the economy continues growing at a 2% - 2.5% annual growth rate, there will be more natural gas demand that should establish a floor under prices and lend encouragement to producers

Offsetting that weakness has been the slight improvement in natural gas prices as investors anticipate increased demand bringing the supply/demand balance in line

Exhibit 9. Gas Shale Output Challenged Despite Falling Rigs



Source: EIA, PPHB

The biggest uncertainty in this scenario is the output of older gas shale wells

that drilling results will be rewarded down the road. The recent victory by the Environmental Protection Agency (EPA) in its battle to erect greater barriers for continued operation of older coal-powered electricity plants should further encourage producers that gas demand will rise faster in the future, further underpinning natural gas prices. The biggest uncertainty in this scenario is the output of older gas shale wells. Will they continue to produce at their current rates or will they experience falling output. If the latter, then any slowdown in new gas well drilling or associated gas output from oil and gas liquids wells will accelerate the rise in natural gas prices.

We think production will continue rising when it should have slowed by now

In our estimation, it is too early to make that call. That is because we have little confidence in forecasts of the pace of overall economic activity, especially for electricity demand. Secondly, we can't discern whether the output from gas shale wells will fall. Lastly, producers remain more optimistic than market conditions would seem to warrant. As a result, we think production will continue rising when it should have slowed by now. Calling for more constrained output in the future when producers seem to be reading price signals as the impetus for sending more drilling rigs back to work in gas fields means the supply/demand balance will take longer to return to balance. The key to how much longer depends, in our judgment, on the health of the economy and the pace at which emission regulations pressure power companies to retire their dirty coal-powered plants and replace them with clean gas-fired ones. The revival of the alternative energy production tax credits at year-end will further delay the supply/demand balance day of reconciliation.

The Power Of Tax Incentives On Wind Promoter Activities

The statistics for new wind generating capacity additions in 2012 tell an interesting story of the power of a potentially expiring lucrative tax

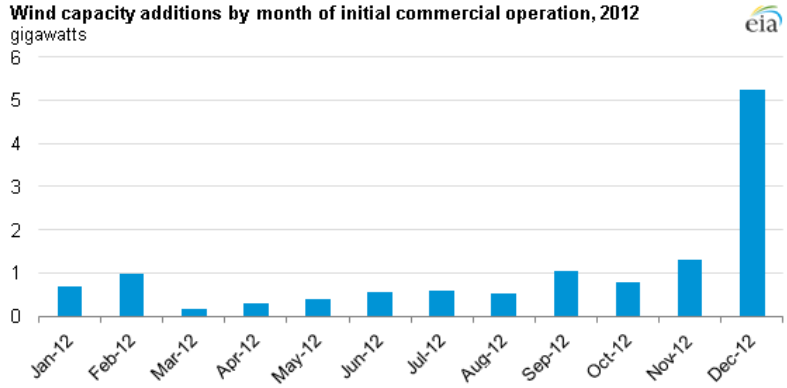
40% of 2012's total of 12,620 megawatts (MW) of wind power capacity additions came on line during December

subsidy on activity. According to preliminary data from the EIA, about 40% of 2012's total of 12,620 megawatts (MW) of wind power capacity additions came on line during December. There were 59 new wind farms that commenced operation that month representing 5,253 MW of power output making this the largest single monthly addition in history.

It was the surge in new additions in December that demonstrate how wind farm developers can get something done when faced with the possible loss of the production tax credit

To understand the impact of the impending demise of the production tax credit that awards 2.2 cents to wind farm developers for every kilowatt-hour of electricity the wind turbines produce, Exhibit 10 shows the amount of new power capacity that entered service in each month of 2012. The pace of new additions entering service grew in September, which was then surpassed by the additions in November. It was the surge in new additions in December that demonstrate how wind farm developers can get something done when faced with the possible loss of the production tax credit and investment tax credit subsidies.

Exhibit 10. 2012 Wind Capacity Additions By Month



Source: EIA

The significance of the potential expiration of the tax subsidies at year-end 2012 was starker because the subsidies were part of the broader battle in Washington between Democrats and Republicans over the Fiscal Cliff negotiations

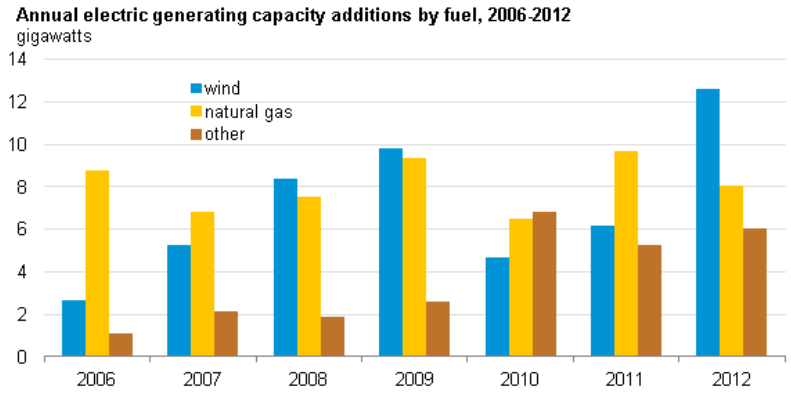
It is interesting to see the impact these various alternative energy tax subsidies have had on the growth in wind power capacity additions over the past seven years. That period includes several starts and stops for the tax subsidies, but each time it was assumed it would be reinstated. The significance of the potential expiration of the tax subsidies at year-end 2012 was starker because the subsidies were part of the broader battle in Washington between Democrats and Republicans over the Fiscal Cliff negotiations and the possibility a Grand Bargain might be struck involving an overhaul of the entire income tax structure coupled with entitlement reforms and federal government spending reductions. When it was perceived that the Grand Bargain wouldn't occur, the resolution to the Fiscal Cliff debt ceiling issue quickly became a bill full of spending and tax subsidy provisions, including the extension of the alternative energy tax subsidies.

An interesting side note to the surge in wind power capacity additions has been the impact it had on the mix of energy sources

This was the first year after two, 2010 and 2011, when natural gas-powered generating capacity additions exceeded wind additions

for new electric generating plants built in recent years. Even though natural gas has been touted as the least environmentally damaging fossil fuel, the push for wind power due to the increase in state clean energy mandates and the profitable tax subsidies resulted in wind power significantly surpassing natural gas in terms of gigawatts of new power capacity additions last year. This was the first year after two, 2010 and 2011, when natural gas-powered generating capacity additions exceeded wind additions. In 2008 and 2009, wind power additions slightly exceeded those of natural gas, but the margin of difference was slight.

Exhibit 11. Electric Capacity Additions By Fuel Type



Source: EIA

Utilities needing to replace ageing coal-powered plants will face a challenging choice in deciding which fuel to use for their new plants

It will be interesting to see how wind power fairs in the coming years as the tax subsidies will remain subject to expiration and the likelihood is that natural gas prices, while rising from their abnormally low levels of the past year, will still remain depressed suggesting that gas surpluses exist. Utilities needing to replace ageing coal-powered plants will face a challenging choice in deciding which fuel to use for their new plants. We anticipate they will select natural gas over wind unless the tax subsidies remain as lucrative and clean energy mandates expand. What we learned from 2012's data is that tax subsidies can be a very strong driver of economic activity, especially when the underlying fundamentals, such as for wind power, are not favorable.

Does Punxsutawney Phil Lead Or Follow The Weather?

On Groundhog Day, the fearless rodent forecaster Punxsutawney Phil, through his handler, predicted an early arrival for spring

On Groundhog Day, the fearless rodent forecaster Punxsutawney Phil, through his handler, predicted an early arrival for spring, suggesting a quick end to the hopes of commodity traders for stronger natural gas prices over the next few months. On February 2nd, residents and visitors gathered early in the morning in Gobbler's Knob in west central Pennsylvania to find out whether the prognosticating groundhog would call for six more weeks of winter or an early arrival for spring. The call is based on the legend that if the groundhog sees his shadow he will be scared back into his lair for

another six weeks of winter, but if there is no shadow, he can begin preparing for warmer weather ahead.

Exhibit 12. A Weather Forecaster At Work

Source: Gene J. Puskar/*AP*

Donning his top hat and tuxedo for the ceremony, the group's president, Bill Deeley, "consults" with the groundhog and then makes the call deciphering what Punxsutawney Phil has to say about the weather

This year marked the 127th Groundhog Day ceremony for the fearless Punxsutawney Phil and his band of handlers, all members of a group known as the Inner Circle. Donning his top hat and tuxedo for the ceremony, the group's president, Bill Deeley, "consults" with the groundhog and then makes the call deciphering what Punxsutawney Phil has to say about the weather. While Punxsutawney Phil is the big deal, his forecasting competition is growing with Staten Island Chuck, Atlanta's General Beauregard Lee and Wiarton Willie from Wiarton, Ontario, Canada. We are sure there are others competing for a piece of Phil's fame, but these fearless forecasters are the ones listed on the National Climatic Data Center Groundhog Day Web page.

Exhibit 13. Big Chill Doesn't Faze Punxsutawney Phil

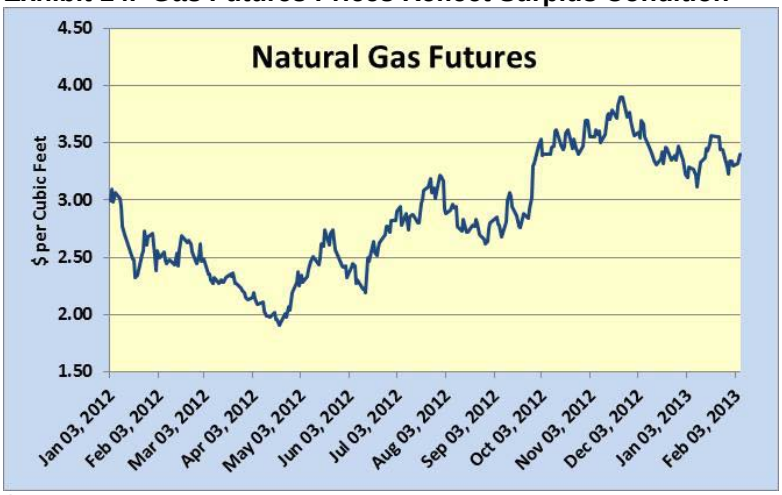
Source: Jason Cohn/*Reuters*

During the run up to the ceremony when Punxsutawney Phil is rudely pulled from his lair in order to give his weather forecast, Jason Grusky, a member of the Inner Circle and also known as The Big Chill, walks around with a thermometer strapped to his body showing the current temperature to the awaiting crowd that this year was estimated to be somewhere in the 20,000 range due to February 2nd falling on a weekend day. So while people were waiting in near zero temperatures, which was boosting energy demand, especially for natural gas, Punxsutawney Phil's prediction of an early spring would ding gas futures prices the following Monday when trading resumed.

Natural gas futures closed on Friday, February 1st at $3.301 per thousand cubic feet (Mcf). By the close of the market the following Monday, they had inched ahead by 1.4 cents, but then jumped by 8.4 cents on Tuesday as meteorologists began tracking and reporting on the likelihood of a blockbuster winter storm targeting the Northeast. So from the day before Punxsutawney Phil was awakened from his winter sleep to three days later, natural gas futures prices had jumped by nearly a dime, or about three percentage points, how come since spring is coming early?

So from the day before Punxsutawney Phil was awakened from his winter sleep to three days later, natural gas futures prices had jumped by nearly a dime

Exhibit 14. Gas Futures Prices Reflect Surplus Condition



Source: EIA, PPHB

When we look at the course of natural gas futures prices over the past 13 months, we can see how the market price for gas has reflected traders' views of upcoming weather trends. Beginning in mid-April 2012, natural gas traders began looking forward to a tightening of supply and demand parameters after what had been an extremely warm winter that resulted in substantially less of a drawdown in gas storage volumes than had been expected. The resulting larger-than-normal storage volumes translated into weaker gas prices as buyers were less willing to load up on new gas volumes for storage for the upcoming 2012/13 winter until we got much closer to the start of the seasonal demand increase. As

We can see how the market price for gas has reflected traders' views of upcoming weather trends

demand for gas in the summer is a function of air conditioning load, an early blast of heat excited gas traders who suspected that the extremely low gas prices would depress gas drilling leading directly to lower supply and higher gas prices. As a result of the expectation of less supply, from a sub-$2/Mcf price on April 19th, gas prices climbed to $2.74 a month later. Prices remained up for a few days before sliding back to about $2.27 by early June. With some extremely hot weather, gas futures prices took off and climbed again, pausing briefly before reaching $3.19 toward the end of July. Traders fought to hold prices above $3/Mcf but that turned out to be a losing battle as supply overwhelmed demand and gas prices slid to $2.70 around the end of August, at which point they reversed and started climbing toward $3.90 by late November as expectations grew that gas prices were destined to break the $4/Mcf barrier. At that point, after failing to break the $4/Mcf barrier, gas prices dropped to $3.23/Mcf before retracing the part of the decline back up to $3.49/Mcf as bitter cold weather briefly gripped the Midwest and Northeast regions of the country. Since then natural gas prices have fluctuated based largely on the outlook for temperatures – rising with projections for colder temperatures or falling on warmer forecasts.

As a result of the expectation of less supply, from a sub-$2/Mcf price on April 19th, gas prices climbed to $2.74 a month later

One phenomenon seems to be that gas futures price movements are less impacted by weekly gas storage withdrawal volumes compared to analyst projections than by meteorologists' forecasts for winter temperatures. When there are large volumes of gas in storage, the future impact from temperatures seems to be more important than when gas storage volumes are low. The shift in the sentiment factor moving gas futures prices seems to be a variation of the marginal change in the glass half full phenomenon – less half full or more half full.

By the time of the last Groundhog Day, meteorologists were beginning to focus on the possibility that a huge winter blizzard would roar through the Midwest and into the Northeast dumping the largest amount of snow of this winter and possibly more than any time during the past several years. Snow has been relatively rare in the Northeast this winter. Since October 1st, 7.4 inches have fallen in New York's Central Park, 6.4 inches fewer than normal. In Boston, 9.6 inches have fallen since December 1st, 14.3 inches below normal, according to the National Weather Service. The storm the weathermen were focusing on was set to become another Nor'easter similar to Super Storm Sandy of last fall that ravaged the New York/New Jersey region. This winter storm, named "Nemo" by the Weather Channel, was projected to emerge from the collision of an Arctic cold wave and a warm front containing substantial moisture. The forecasters believed the storm was likely to drop 8-10 inches of snow in New York City and maybe 12-14 inches in Boston. Northeast Pennsylvania was projected to receive about 4-6 inches of snow.

By the time of the last Groundhog Day, meteorologists were beginning to focus on the possibility that a huge winter blizzard would roar through the Midwest and into the Northeast dumping the largest amount of snow of this winter and possibly more than any time during the past several years

Nemo arrived, but its effects were varied across the region. Five cities in the Northeast all received more than 28-inches of snow, with Hamden, Connecticut getting the most with 40 inches deposited on the area. A handful of cities received record snowfalls with Portland, Maine getting 31.9-inches, which is the largest winter deposit ever. Worcester, Massachusetts and Harford, Connecticut experienced their third greatest snowfall amounts ever, while Boston, Massachusetts and Concord, New Hampshire totaled their fifth greatest snowfall amounts.

Is Punxsutawney Phil really a forecaster or does he merely reflect current weather trends?

While Punxsutawney Phil was pronouncing an early arrival for spring, the blast of winter weather from Nemo raises questions about the groundhog's forecasting ability. Is Punxsutawney Phil really a forecaster or does he merely reflect current weather trends? Based on the track of natural gas futures prices prior to Groundhog Day, the early spring call had to be favored. Although Punxsutawney Phil may be little more than a momentum follower, his day of fame certainly helps boost the economy of the rural town of Gobbler's Knob, something we are sure is welcomed by its citizens.

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