PPHB

ENERGY INVESTMENT BANKING

# MUSINGS FROM THE OIL PATCH

**December 6, 2011**

**Allen Brooks**
**Managing Director**

**Note***: Musings from the Oil Patch reflects an eclectic collection of stories and analyses dealing with issues and developments within the energy industry that I feel have potentially significant implications for executives operating 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

## Imagining The Future For The Natural Gas Industry

**The price drop, one of the largest daily corrections in a long time, brought further pain to industry participants**

A week ago Monday, the December natural gas futures contract traded on the CME exchange closed out its existence at $3.36 per thousand cubic feet of gas (Mcf), down $0.18 from the closing price of $3.54/Mcf posted the previous trading day, which happened to be the Friday after Thanksgiving and a notoriously light trading day. Natural gas prices had been buoyed in the period immediately before Thanksgiving by expectations that colder than normal weather over large parts of the gas-consuming areas of the country would hike demand. Futures prices were higher despite large and growing natural gas storage volumes. On that last trading day, cold weather prospects had shifted in favor of expectations for warmer than anticipated temperatures and thus depressed gas demand. The price drop, one of the largest daily corrections in a long time, brought further pain to industry participants. But as one private equity investor very active in the upstream oil and gas business put it, “It’s got to change!” Yes, it will. The problem is that it could get worse!

**Current industry conditions reflect a certain Jekyll and Hyde quality**

We’ve been spending considerable time wrestling with trying to define the natural gas industry’s outlook as it is very important for this country’s economy and for those people who are actively engaged in the business. Could it get worse? Can it get better? Current industry conditions reflect a certain Jekyll and Hyde quality – activity is up and growing but the price for the product is low and falling. What would it take for natural gas prices to recover? Would those actions help or hurt future industry activity?

Beyond those immediate concerns, we are wrestling with what the next phase for the industry might look like? How will the industry change as it transitions from its current state to whatever that next phase is? Will natural gas play an even greater role in our nation’s

power generation business? Can natural gas power a meaningful segment of our future car and truck fleet? Will the U.S. remain a natural gas importer or become a significant gas exporter? These and many other questions have been filling our head and dominating our discussions with people in the business. To try to make sense of what is happening now, but more importantly what might happen in the future, we felt we needed to step back and take a very high level perspective of the business and current trends. It meant we needed to get away from the trees that restrict our view of the forest. (It will take several articles to examine these issues and attempt to define how the future might unfold.)

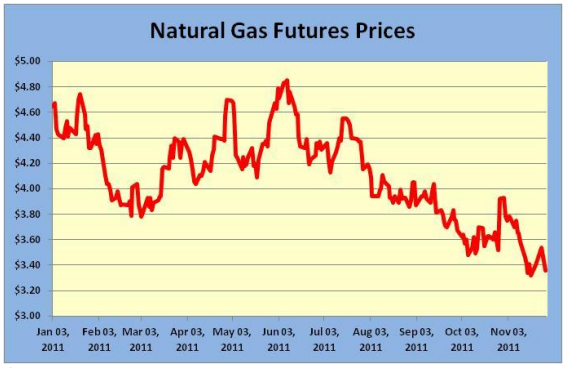
**So far this year, it becomes clear we have experienced two distinctly different outlooks for the industry**

When we look at a chart of the price of the near-month natural gas futures contract (Exhibit 1) so far this year, it becomes clear we have experienced two distinctly different outlooks for the industry. One was predicated on optimism about a growing economic recovery coupled with anticipation for falling natural gas production. The other view was marked by a weak economy with a potential for it getting worse given global economic and credit market uncertainties, coupled with growing frustration over continuing production growth despite weak natural gas prices.

**Futures prices reached their peak at the beginning of June and began falling shortly thereafter**

The futures price history shows that once last year's cold winter ended and gas supplies proved more plentiful than we needed, a price rout was on. Prices began recovering, however, when economic statistics suggested that the pace of the U.S. recovery was accelerating in the spring. Futures prices reached their peak at the beginning of June and began falling shortly thereafter when fears of a faltering recovery emerged. Since that price peak, the trend has been steadily downward interrupted by a few brief rallies before prices reached the low for the year on November 28th.

**Exhibit 1. Natural Gas Prices Slid In 2H 2011**



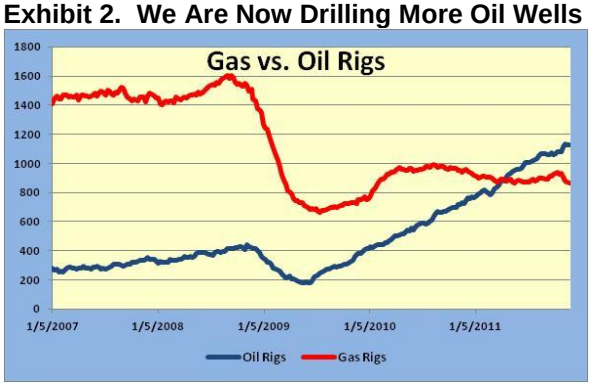

**Source: EIA, PPHB**

The decline in gas futures prices throughout the second half of 2011 has been marked by concerns about the deteriorating U.S. economic recovery that has sustained high unemployment, created few new jobs, generated little income growth and remains hobbled by huge federal, state and local government deficits and a weak

housing market. Adding to the domestic economic woes are concerns about sovereign debt levels throughout most of Europe, the health of the global banking system and now a possible slowing of the Chinese economy. In addition to the global economic challenges are the geopolitical pressures from social and political unrest in North Africa and the Middle East, coupled with tensions over the Iranian nuclear question. Throw into the mix the upcoming national elections around the world that reflect sharp political divisions and lead to partisan politics and caustic rhetoric. All in all, the pot being stirred is large and boiling. Will an improving economic recovery in the U.S. yet be overwhelmed by the problems of Europe and possibly an economic slowdown in China? The answer to a question such as that will shape the price curve for natural gas and the industry's ability to access capital markets to continue its high spending rates of the past several years.

**Will an improving economic recovery in the U.S. yet be overwhelmed by the problems of Europe and possibly an economic slowdown in China?**

**Exhibit 2. We Are Now Drilling More Oil Wells**



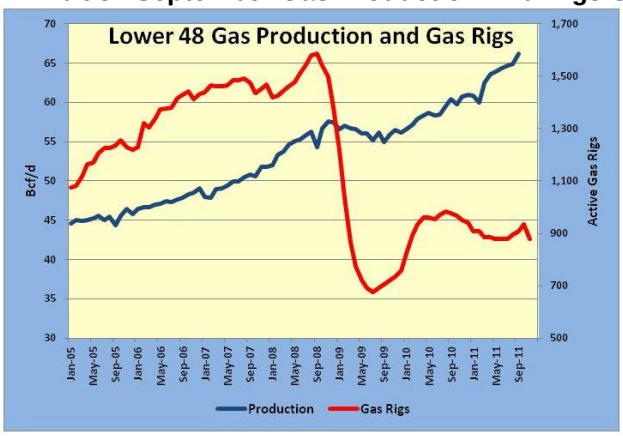

**Source: Baker Hughes, PPHB**

Domestic natural gas production continues to grow despite a decline in the number of drilling rigs targeting gas wells. Production growth was anticipated to be slowing or even possibly declining by now after producers began targeting shale oil and liquids-rich plays and abandoning dry natural gas drilling more than a year ago. Unfortunately, industry watchers failed to appreciate the substantial volumes of natural gas associated with these oily plays. As a result, the shift in drilling emphasis has failed to stem the rise in natural gas production. If anything, the most recent preliminary production data from the Energy Information Administration (EIA) for September, which is based on the government's form 914 survey, showed one of the largest monthly jumps in onshore Lower 48 gas production since the data series began being reported in January 2005.

**The shift in drilling emphasis has failed to stem the rise in natural gas production**

The September estimate showed a 4.3% increase over August, and since the average number of gas-oriented drilling rigs was up month over month, this large production jump is likely accurate. The only other times when monthly production increases were about the size of the September increase happened after weather impacted production in the prior month – in March 2011 after the February

**Exhibit 3. September Gas Production And Rigs Up**




**Source: EIA, Baker Hughes, PPHB**

wellhead freeze-offs and in October 2008 after tropical storms and flooding limited production in many Gulf Coast states.

**A critical question is why are producers still drilling gas wells when prices are so weak and prospects for their improvement bleak?**

A critical question is why are producers still drilling gas wells when prices are weak and prospects for their improvement bleak? The short answer is money. In the mad, mad world of the gas shale revolution, corporate business strategies have been completely overhauled to emphasize building large land positions enabling companies to demonstrate that they have the potential to grow reserves and production – or in other words building larger companies.

**To supplement cash flow, producers have engaged in every known trick in the finance book to boost available funds**

Gas shale wells are expensive to drill and complete as well are the cost of the leases on which they are drilled. Even though initial gas production from shale wells is huge, the low price has depressed the amount of cash companies are receiving. As a result, producers are spending well in excess of their cash flows. To supplement cash flow, producers have engaged in every known trick in the finance book to boost available funds. These tactics include hedging forward future production whenever high prices are available, tapping Wall Street to raise equity and debt, and seeking out relationships such as joint ventures with larger, and often foreign, oil and gas companies.

**Exercising a successful strategy often creates a vicious cycle – more acreage and wells equals increased production and depressed prices**

In order to access Wall Street capital, producers have needed to demonstrate that they are being successful in exercising a strategy for aggressive wealth creation. That means aggressively buying acreage and drilling wells. Exercising a successful strategy often creates a vicious cycle – more acreage and wells equals increased production and depressed prices. This cycle will continue as long as the music (Wall Street's money) continues to flow. Once that stops, we will see how many producers can find a chair in the room. In the meantime, the fun continues!

**The joint ventures entered into over the past several years are beginning to wind down**

It does seem, however, that certain funding sources are becoming less accommodating. Producers who were actively seeking joint venture partners are finding fewer candidates available, even though one venture involving a Canadian company and a Chinese company was announced last week. Importantly, though, the joint ventures entered into over the past several years are beginning to wind down so the amount of financial support for leasing new acreage and drilling more wells may be about to start on a permanent decline. The data in Exhibit 4 comes from a slide shown at a recent *Platts* industry conference and shows many of the large shale gas joint ventures and when they end.

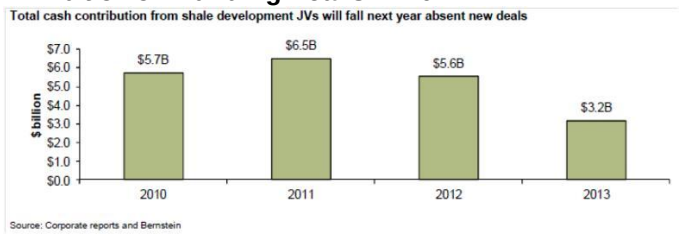
**Exhibit 4. Gas Shale JVs Start Winding Down**


**Source: *Platts***

**There is a peak in joint venture funding this year with declines projected for each of the next two years**

A recent research article on the outlook for aspects of the oilfield service industry authored by Bernstein Research showed a chart (Exhibit 5) with their estimate of the amount of money that has come from industry joint ventures along with a forecast for 2012. The chart shows a peak in joint venture funding this year with declines projected for each of the next two years.

**Exhibit 5. JV Funding Peaks In 2011**

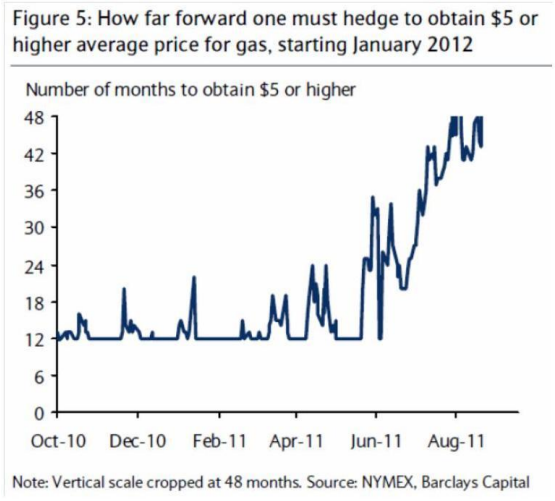



**Source: Bernstein Research**

Another source of incremental cash funding for the industry over the past several years has been the ability to hedge future production at higher than current spot prices. That opportunity also appears to be disappearing. A *Platts* slide (Exhibit 6) showed how many months

forward a producer had to go in order to hedge production at $5/Mcf or greater since 2009. As the chart shows, a producer used to only have to go out about 24 months. This year that time frame has extended out to at least 54 months.

**Exhibit 6. $5/Mcf Hedging Time Frame Lengthens**

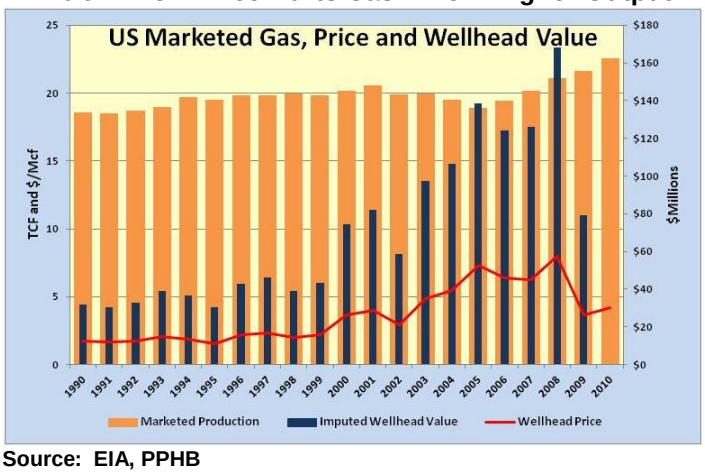



**Source: *Platts***

**A producer has to go out 36 months, or to December 2014, to find the first monthly price of $5/Mcf or more**

Because the futures market is volatile, we looked at a recent forward price curve and found that a producer has to go out 36 months, or to December 2014, to find the first monthly price of $5/Mcf or more. Since that month is in the height of the winter, we looked further out to find when prices are sustained above that $5/Mcf threshold. One has to look into 2016 to find that period, which happens to be in the range of 54 months from now. Meaning producers will have a tougher time raising capital through hedging operations. According to *Platts*, today the percentage of year-forward production hedged by producers is the lowest it has been in the past three years.

**Exhibit 7. Low Price Hurts Cash From Higher Output**




**Source: EIA, PPHB**

**With less opportunity to bolster cash flow from hedging and joint venture cash, a likely decline in gas drilling appears on the horizon**

From a big picture point of view, one can see how low gas prices have negatively impacted the revenue from existing production even though production is growing and continues to grow. With less opportunity to bolster cash flow from hedging and joint venture cash, a likely decline in gas drilling appears on the horizon as the ability to tap Wall Street markets for additional capital also has become limited. Oil and gas capital spending surveys for next year will be announced soon and we will begin to gain an understanding of the willingness of producers to continue on their high-octane drilling pace. For a thirsty stranger in today's natural gas desert, we sure hope what we see on the horizon is not a mirage.

## EIA's Headline Is Obvious But Misses The Critical Point

While perusing the Energy Information Administration's (EIA) web site last week we came across an interesting story about wind power. As we all know, wind and other renewable energy sources have been the focus of the Obama administration energy strategy, so the EIA has been increasingly engaged in preparing articles and research demonstrating the positive aspects of the green energy agenda and how the nation will derive economic benefits from their increased use.

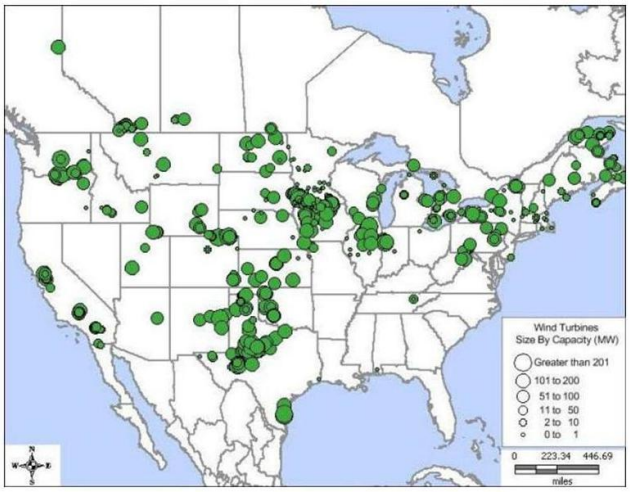
**There is a concentration of wind turbines throughout the central region of the country along with a scattering of turbines throughout the Northeast and the upper Midwest states**

We were slightly taken aback by the story headline, however, which read: "Wind generating capacity is distributed unevenly across the United States." The headline seemed to be presented as a negative, meaning that there was something wrong with the distribution of wind turbines in America. Immediately under the headline was a map (Exhibit 8) that showed the location of the wind turbines in this country sized by the number of turbines in each specific area. What we noticed was the concentration of wind turbines throughout the central region of the country along with a scattering of turbines throughout the Northeast and the upper Midwest states. There was also a small number of turbines located in the Mountain states along with some in Washington, Oregon and California. The surprising aspect of the map was the absence of wind turbines throughout the Southeast region of the country, something we were aware of but had not focused on. Was this absence of wind turbines the justification for the web page headline? We decided to see what the EIA had to say about this turbine distribution, although we felt we knew the answer.

**At the end of 2010, the United States had 38 gigawatts (GW) of installed wind generating capacity that produced 2.3% of the nation's electricity**

We were amused by the text that accompanied the chart along with a second chart in the article. The EIA indicated that as of the end of 2010, the United States had 38 gigawatts (GW) of installed wind generating capacity that produced 2.3% of the nation's electricity. The article went on to describe that the greatest concentration of wind turbines in the U.S. was in the Great Plains states where wind conditions are the best. The EIA said, "The siting of wind turbines is dependent on the surrounding climate, as turbines are best utilized

**Exhibit 8. Wind Farm Locations Across The U.S.**




**Source: EIA**

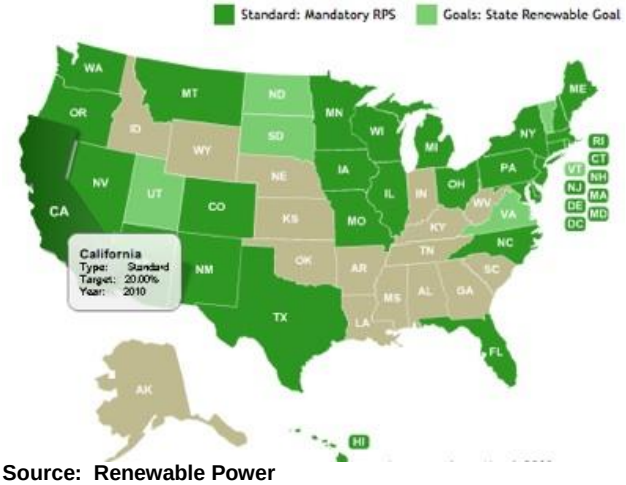
in windy areas." Duh! We know that the wind is intermittent. Equally, we know it is hard to turn a wind turbine when the wind isn't blowing. So we wondered why the EIA would make that statement.

The agency went on to opine that wind generating capacity installed in the other areas of the country was largely the result of mandated requirements directing power companies to buy a certain percentage of their energy supply by an arbitrary future date from providers of renewable energy supplies. These state mandates, known as Renewable Portfolio Standards (RPS), or in some cases Alternative Energy Portfolio Standards (AEPS), have been put in place by 29 states and the District of Columbia. In addition, there are five states that have instituted renewable energy goals rather than an RPS. The idea behind the RPS is to force local electric utility companies to purchase power supplies from a variety of renewable energy sources such as wind, solar, biomass and geothermal. Many states also count hydroelectric power in their measurement of RPS attainment. The percentages and dates for reaching them vary by state, but they range from a low of 10% in Michigan and Wisconsin (several others have this target but they are voluntary targets) to as much as 40% in Hawaii. In order to reach these goals, electric utilities are investing in different renewable energy projects and purchasing power from others, in some cases outside their home state, producing power from renewables. The concept behind constructing a portfolio of renewable energy supplies reflects the fact that none of them individually are large providers of energy. This is because renewable energy sources have challenges in scaling up their output.

**The idea behind the RPS is to force local electric utility companies to purchase power supplies from a variety of renewable energy sources such as wind, solar, biomass and geothermal**

The EIA attributed the lack of wind turbines in the Southeast region of the country to the combination of low wind speeds and the lack of wind-focused, state-level RPS programs. But the EIA also admitted

**Exhibit 9. States With Renewable Power Standards**



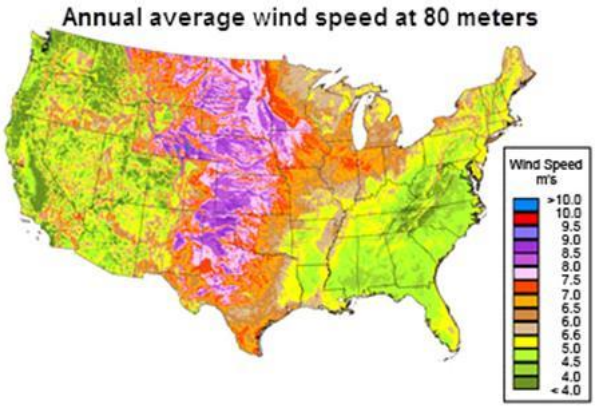

**Source: Renewable Power**

that this region has a large inventory of relatively new natural gas combined-cycle power plants that are not fully utilized, so one would not expect the power industry to be investing capital in new renewable energy facilities given the under-utilized existing power generating capacity.

**This map clearly shows that the strongest wind resources are centered in the central part of the nation**

Also posted with the article and the map of wind turbine locations was a map of the nation's wind resources. As one would expect, this map clearly shows that the strongest wind resources are centered in the central part of the nation. There are some isolated areas in New England, the upper Midwest and the West that possess moderately strong wind resources. What becomes quite clear from examining the map showing annual average wind speed over the continental United States is that the wind turbines located outside of the central core of the country have been installed more because of RPS mandates than the attraction of wind resources.

**Exhibit 10. Attractive U.S. Wind Power Locations**




**Source: EIA**

**A problem that comes from locating wind turbines where the wind is the strongest and most consistent is that it also happens to be where power is not needed**

The EIA is accurate in its assessment of the wind turbine placements. They are distributed unevenly, but that is a function of the geographic concentration of wind resources in the nation and the workings of government mandates. Encouraging the placement of wind turbines where the wind doesn't blow seems to us to not make much economic sense, although this is often not considered by politicians in constructing RPS mandates. A problem that comes from locating wind turbines where the wind is the strongest and most consistent is that it also happens to be where power is not needed – rural areas of America. As a result, either the electric power companies or the government needs to construct high-power transmission lines to move the power from where it is generated to where it is needed. This is an added cost of renewables.

**Seldom do advocates of RPS's address the total cost of their pet fuel – wind – because either they don't understand the economic burden they place on the electric utilities forced to buy this green power, or they believe its high cost is justified, especially since the mandates usually spread the additional cost over all power buyers in the state**

Seldom do advocates of RPS's address the total cost of their pet fuel – wind – because either they don't understand the economic burden they place on the electric utilities forced to buy this green power, or they believe its high cost is justified, especially since the mandates usually spread the additional cost over all power buyers in the state. This is an unfair economic cost, especially for companies that don't buy their power from the dominant utility in the state. For example, in Rhode Island the two large industrial users, who use more power than any other user in the state, are being forced to pay for the increased cost of offshore wind power planned to be constructed in order to meet a state RPS even though these companies purchase their power supplies from other electricity providers and only use the local utility to deliver it. As inequitable as this policy sounds, we have to remember that RPS's were never designed to be economic, but rather they were designed to use morality to satisfy a political agenda.

## Who Will Finance The Energy Supplies For Our Future?

**The Particular article we are focusing on is a good example of that lack of intellectual curiousity demonstrated by the author about how we are going to finance renewable energy in the future**

The title of this article was the subtitle of an article in the November/December issue of *Energybiz* magazine titled, "Financing Renewables Going Forward." *Energybiz* is largely devoted to the state of the renewable fuels sector with lots of articles discussing the latest developments (almost always in a positive light) and often authored by people actively engaged in the business. The magazine is a good way to stay up on what is happening in the renewables sector, which as readers of the *Musings* know, I spend time monitoring and commenting on. Many of the articles fall in the category we call "puff" pieces as the writers embark on discussing a topic, secure quotes from people engaged in the business, but never question either what the quote signifies or what might be behind the quote. The particular article we are focusing on is a good example of that lack of intellectual curiousity demonstrated by the author about how we are going to finance renewable energy in the future.

The author began his article by pointing out that the impact of federal and state finances, funding for renewable projects has

slowed down in 2011. This is particularly important given the expiration of a number of renewable energy subsidies at the end of this year. While many renewable energy financing inititatives have already been terminated, the primary remaining support comes largely via tax credits. The author went on to point out that three "innovative" solar companies had filed for bankruptcy, including the infamous Solyndra, despite $527 million of taxpayers funding. His lead-in question is, "If governmental subsidies are diminishing and some renewable startups are going out of business, who will finance the industry to help it grow in the United States?" This is a legitimate question.

**This gentleman prefers to use the term "incentives" rather than "subsidies" because he believes the former term contributes to the view that the money is enabling an emerging industry to grow more rapidly**

The president of the American Council On Reneable Energy is quoted in response to the question. He says that the cutbacks will mean that the growth of renewables will slow. The author pointed out that this gentleman prefers to use the term "incentives" rather than "subsidies" because he believes the former term contributes to the view that the money is enabling an emerging industry to grow more rapidly. The figure that for every million dollars invested in renewables and clean energy, 17 jobs are created, was used to bolster the case for government support of the business. We assume this figure comes from the council president since it was stated that the clean energy jobs created are said to outpace job creation in oil, gas and defense industries. So how does this expert explain that Solyndra, the solar panel company, with more than half a billion dollars in taxpayer support, could only create 1,100 jobs, costing roughly $500,000 each and now all lost with the bankruptcy?

**He highlights that the RPS creates a positive investment climate due to the savings from tax credits**

The author interviews the leader of the power and renewable energy group at GE Energy Financial Services, a subsidiary of GE (GE-NYSE), an aggressive promoter of green energy projects. He describes the positives of the renewable portfolio standards (RPS) that mandate the purchase of electricity produced from green energy sources. He highlights that the RPS creates a positive investment climate due to the savings from tax credits. In states with RPS's, he says it is easier to use debt financing and tax equity (the immediate conversion of tax credits into cash for investment), but in states without these standards, "You may have difficulty convincing a utility to buy power that makes sense economically." Let me see if I get this. In states lacking RPS's, electric utility companies that need additional power will turn down a supply source that makes sense economically? I guess that means we have dumb utility executives who buy uneconomic power because they aren't forced to buy renewable power. Count me as a skeptic, but I'm betting that the concept of "makes sense economically" may be a function of how you look at it. We know that wind power analyses usually ignore the cost of the transmission lines to haul the power to the state, the short life of the wind turbines and the incremental cost of backup power to provide electricty due to the intermittent nature of wind power.

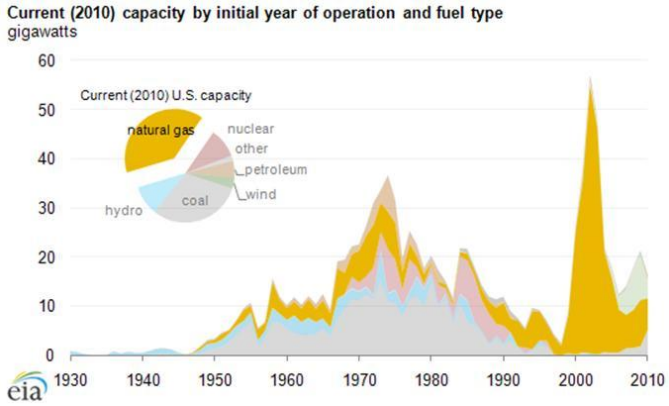
**His quote was used to illustrate that the problems currently plaguing the solar business would change, eventually allowing them to grow and prosper**

After not having delved into the reasoning behind that quote, we were wondering who else the author would interview and what gems of analysis they might impart. The author turned to the investment web site Motley Fool contributor Travis Hoium. His quote was used to illustrate that the problems currently plaguing the solar business would change, eventually allowing them to grow and prosper. Mr. Hoium stated, "Renewable energy bashers like to point to unsustainable subsidies as the major reason [renewable] energy isn't worth investing in. However, they fail to remember that most coal and natural gas power plants were built decades ago and benefited from government subsidies."

**Coal-powered generators were the dominant plants built from the late 1950s through the mid 1980s**

It would seem, however, that Mr. Hoium needs to do a little investigating about the historical growth of the power industry. The chart in Exhibit 11 shows all the power plants in operation at the end of 2010 and when they went into service and what fuel they use. Coal-powered generators were the dominant plants built from the late 1950s through the mid 1980s. After that, natural gas-fueled plants dominated the new generating capacity additions. What we do see is that beginning about the middle of the last decade, wind power generating capacity became a significant factor, but that was largely driven by the introduction of state RPS's and government subsidies.

**Exhibit 11. Age And Power Source For Existing Plants**




**Source: EIA**

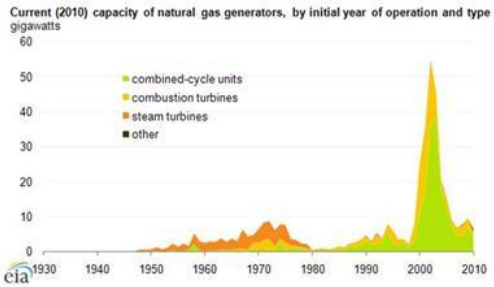
**Nearly 237 GW of natural gas-fired generation capacity was added between 2000 and 2010, representing 81% of total generation capacity additions over that period**

What the EIA wrote about this chart is telling in correcting Mr. Hoium's statement. The EIA pointed out that as of year-end 2010 the Nation's total electric generation capacity was 1,042 gigawatts (GW). Natural gas-powered generation represented 39% of that total. More importantly, nearly 237 GW of natural gas-fired generation capacity was added between 2000 and 2010, representing 81% of total generation capacity additions over that period. The EIA further destroys the Motley Fool contributor's argument by pointing out that "by the late 1980s and early 1990s, an improved price and supply outlook for natural gas, and more efficient combined-cycle technology, encouraged the greater use of natural

**"With the power industry restructuring of the 1990s, the construction of new power plants was dominated by independent power producers who favored natural gas generation due to short construction times and low capital costs"**

gas for power generation (the restrictive provisions of the Fuel Use Act were repealed in 1987). With the 1990s' power industry restructuring, the construction of new power plants was dominated by independent power producers who favored natural gas generation due to short construction times and low capital costs." Nowhere in the EIA's write-up explaining the changes in the composition of the Nation's power generating capacity does it mention subsidies. I'm sure that if the federal government was subsidizing coal- and natural gas-powered generating plants, the EIA would have wanted to not only note that fact but demonstrate that the use of subsidies for renewables today was merely continuing an historical trend and was designed to foster faster growth for a desirable energy supply. As the EIA's data and explanation point out, the key to the growth of coal and natural gas in the electric power generating mix was due to economics and technology, not government handouts.

**Exhibit 12. Age And Type Of Nat Gas Plants**




**Source: EIA**

**The spokesperson says that the tax credit makes wind projects cost-efficient**

This story line stands in sharp contrast to the next topic the *Energybiz* article addressed. That had to do with energy companies increasing their renewable portfolios. The article pointed out that successful energy companies building their renewable portfolios have to depend on subsidies to defray the costs. The author used NextEra Energy Resources, a subsidiary of NextEra Energy, Inc. (NEE-NYSE), which has 44% of its portfolio in wind, 35% in natural gas, 13% in nuclear, 2% in hydro and 1% in solar as his example. The author talked to a spokesperson for the company who talked about the wind generation portfolio and how turbines are more efficient and cheaper today than they were several years ago. As a result of the change in cost structure, the company says it has been able to build wind farms in locations that in prior years it would not have been able to construct. The key, however, is the 2.2-cents per kilowatt-hour tax credit for wind projects. The spokesperson says that the tax credit makes wind projects cost-efficient. He supposedly told the author that renewables depend on public policy support to stay price-competitive with other forms of energy. So without the tax credit, renewables would never be competitive with traditional fossil fuels. That is not surprising since the EIA has shown repeatedly that renewables are the most heavily subsidized fuels and that traditional fossil fuels are the least subsidized.

The balance of the article focused on the green jobs issue and the need for energy subsidies in order to achieve the goal of its promoters. Donald Furman, former president of the American Wind Energy Association, discussed the fact that this country needs a coherent national energy policy to confront the reality that China has overtaken the United States in developing renewable energy. According to Mr. Furman, a strong renewable energy policy in the United States, coupled with government subsidies, would create 274,000 jobs by 2025 with every state showing employment growth. Of course, the Keystone XL Pipeline that the Obama administration has effectively shelved for the next 18 months would have created 120,000 jobs within 12 months and would have been totally funded by private enterprise. The renewable energy policy pushed by Mr. Furman would involve more government involvement in the energy business and continued taxpayer subsidies.

**A strong renewable energy policy in the United States, coupled with government subsidies, would create 274,000 jobs by 2025 with every state showing employment growth**

The author decided to close his article with a quote from Tom Friedman, *The New York Times* Pulitzer Prize winner and book author, who says that the only effective and sustainable way to produce green jobs is with a fixed, long-term price for dirty fuels that creates consumer demand for and sustained private sector investment in renewables. We would suggest that Mr. Friedman look at what is going on in Europe at the present time. Europe has long been a leader in trying to establish a price for carbon as a way to control pollution. The sovereign financial problems sweeping the continent have slowed economic growth. Several of the continent's countries are believed to be in recession at the present time with the possibility that more may enter by next year. As a result of the economic slowdown, the price for carbon has collapsed. The collapse of the carbon price also reflects the fact that the regulatory system created too many offset credits that can't be used. The idea behind the system of carbon credits is that by pricing the carbon content in various energy fuels it becomes possible to boost the price of dirty fuels and incentivize consumers to use more green fuels. The funds raised from this pricing system are targeted for use in supporting the higher cost renewables that are favored because they are cleaner fuels. The scheme appears to be falling apart due both to structural problems within the system and the overall economic and financial problems in Europe. Given Europe's current financial conditions and outlook, it doesn't appear this carbon pricing scheme will function as designed or envisioned anytime soon.

**Given Europe's current financial conditions and outlook, it doesn't appear this carbon pricing scheme will function as designed or envisioned anytime soon**

After reading this article, we wondered why there was no questioning of those people interviewed about the facts cited or their positions. The quotes begged for a follow-up question or explanation. To have added some additional discussion would have strengthened the article, but as we have shown, it might have undercut the positive spin for renewables the author was trying to achieve. For those who are uninformed, reading the article would lead them to conclude that renewables are making huge headway in the market place. The reality is that without the government's

**The quotes begged for a follow-up question or explanation**

support, renewables are, and will continue to, struggle to make economic sense.

## Chevy Volt Battery Fire Prompts Study And Concern For EVs

**The announcement of the study and the incidents behind the need for it were only reported by the automobile media and not by the mainstream media**

In our last *Musings* we wrote about a new study being undertaken by the National Highway Traffic Safety Administration (NHTSA) following a fire involving the lithium-ion battery of a Chevy Volt electric vehicle (EV) that had been utilized in a side-crash test several days prior and a fire that started during recharging of a Volt when it was parked in the owners' garage. The announcement of the study and the incidents behind the need for it were only reported by the automobile media and not by the mainstream media. That situation changed last week after another Volt caught fire following another a safety crash test. *The New York Times* featured a page one story in its business section about the battery fires and the new federal investigation. Notably absent was any reference to the investigation of the recharging battery fire.

**There were also reports that GM was willing to go as far as buying back Volts from customers who were concerned**

The *Times* article was headlined "A Setback for Electric Cars – Fires in Chevrolet's Volt May Hurt Sales of Battery-Powered Vehicles." The article pointed out that while General Motors (GM-NYSE) remains convinced its EV is safe the auto company is making free loaner cars available to Volt owners who are concerned about the safety of their vehicle. There were also reports that GM was willing to go as far as buying back Volts from customers who were concerned. As the article put it, "the federal investigation represents an unexpected hurdle for the nascent technology." While GM points out that the issue isn't the safety of the people in the car at the time of the accident, it is the risk that at a later time after an accident in which a battery is damaged that it can heat up to the point it starts a fire. In the first battery fire incident, the fire was so hot that it damaged other cars parked nearby.

**Exhibit 13. Battery Pack Locations For EVs**

**Chevy Volt** **Nissan Leaf** **Tesla Roadster**

**Source:** ***The New York Times***

**The Obama administration has made EVs a focal point of their green energy initiative**

The Obama administration has made EVs a focal point of their green energy initiative. The federal government has lavished substantial financial grants and loan guarantees on battery manufacturers with the hope that they will create thousands of green jobs. So far, as we have chronicled, those jobs have not materialized. That may be

**The total of 12,500 EVs represents 0.0013 percent of the 9.5 million autos sold in the U.S.**

partly due to the lack of initial success in selling EVs. Through the first ten months of 2011, Chevrolet has sold 5,300 Volts and Japanese automaker Nissan (NSANY.PK) has delivered 7,200 Leaf models. The total of 12,500 EVs represents 0.0013 percent of the 9.5 million autos sold in the U.S. during this time period. The market for EVs is so tough that another manufacturer, Aptera, sporting a tentative federal loan guarantee, closed its doors at the end of last week.

**So the more EVs and hybrids a car manufacturer can sell, the less he has to improve the fuel efficiency of the rest of his car offering**

The challenge for the Obama administration is that EVs and hybrid vehicles, which peaked in sales two years ago, will be the only way automakers will be able to meet the recently agreed-to fleet fuel-efficiency standard of 54 miles per gallon by 2025. As we wrote in a prior *Musings*, not only will EVs and hybrids be rewarded with very high mileage ratings, each of these vehicles will count as a multiple of a conventional combustion engine vehicle when calculating a company's fuel-efficiency rating. So the more EVs and hybrids a car manufacturer can sell, the less he has to improve the fuel efficiency of the rest of his car offering. This will enable auto makers to sell bigger, heavy vehicles with low mile-per-gallon ratings, but which have traditionally achieved large profit margins.

**Many of these buyers may opt to just wait for the next model year, thereby creating a regulatory risk for an auto manufacturer**

While we are not predicting this to happen, we certainly could envision a scenario whereby if you didn't buy a new car early in the model year, you might be left with only EVs and hybrids as choices in the latter months as an auto manufacturer needs to boost their sale in order to meet his fleet fuel-efficiency target. This scenario could create the "hot car" phenomenon for big, less fuel-efficient vehicles at the beginning of the year, an environment when dealers can sell certain models at full list price or even at a premium. Towards the end of the year, discounts on EVs and hybrids would likely become greater to insure the manufacturer doesn't fail to meet the fuel-efficiency standard and have to face paying fines on vehicles sold. The challenge will be if car buyers don't want to purchase EVs and hybrids for various reasons that cannot be overcome purely by a low price. Many of these buyers may opt to just wait for the next model year, thereby creating a regulatory risk for an auto manufacturer. This scenario will put a premium on marketing and selling strategies.

**The crash-related fires developed after heat due to a chemical reaction within the battery caused the vehicle to catch fire**

Since there has been no information about the fire associated with the Volt recharging incident, we are only left with the details about the fires following the several side-crash tests. (We'd like to know the details of the recharging fire since that could create a greater safety challenge for EVs.) Reportedly, the crash-related fires developed after heat due to a chemical reaction within the battery caused the vehicle to catch fire. The batteries in question were damaged by metal piercing the battery case during the crash test and setting off a chemical reaction that generates heat. Therefore, the focus of the NHTSA study will be on the stability of batteries following crashes.

**According to recent news articles, the NHTSA study will look at the design, location and cooling system for the battery pack**

According to Mary Barra, head of global product development for GM, the pressing issue is ensuring that batteries are de-powered by trained service personnel after a collision. She said, "When electrical energy is left in a battery, it's similar to having gasoline in a tank of a car that has been damaged." While that analogy would seem correct, gasoline left in the tank of a car doesn't often catch fire spontaneously. It would seem there are two possible solutions to the battery fires, although they are complementary solutions rather than alternatives. One solution would involve adding more protection around the battery pack in the vehicle to reduce the risk of the battery case being pierced. According to recent news articles, the NHTSA study will look at the design, location and cooling system for the battery pack. A solution might involve adding additional shielding or strengthening the battery case itself. It could also involve redesigning the layout of the cooling system. The downside to these possible solutions is added weight, reduced battery charge performance, less space in the vehicle and additional cost, none of which are attractive scenarios for Chevy. In the interim, the company has announced it will offer loaner vehicles to owners who are concerned about the risk of their vehicle. Reportedly there is also a plan to buy back any Volts that owners want to sell, but no details have been disclosed. We are aware, however, that GM is making loaners available in a very limited number of cases, even though the financial exposure to the company is small since so few cars have been sold.

**These solutions could represent further challenges to auto manufacturer efforts to boost the popularity of EVs and hybrids**

The second solution would be training and certifying technicians who would de-power lithium-ion batteries following EV crashes. That means that possibly only those salvage yards that employ such trained staffers would be able to tow and store EVs. Think of the logistical nightmares that would create, plus the added cost for EV owners involved in a crash. These solutions could represent further challenges to auto manufacturer efforts to boost the popularity of EVs and hybrids. With plans for one million EVs to be on the road by 2015, the NHTSA battery study could become a huge hurdle for the Obama administration's bet on this technology, while putting at risk significant American taxpayers' money that is being used to backstop that effort.

## Will High Gas Prices Really Drive People To Mass Transit?

**Whenever gasoline prices rise above $3.50 per gallon, discretionary driving has been curtailed**

We recently read a précis of an upcoming article by Bradley Lane of the University of Texas at El Paso to be published in the *Journal of Transport Geography* that focuses on the impact of high gasoline pump prices on ridership of mass transit in urban areas. I think most of us are familiar with the relationship between miles driven and pump prices. Whenever gasoline prices rise above $3.50 per gallon, discretionary driving has been curtailed. By the time prices reach or exceed $4 per gallon, the media are broadcasting and writing stories about the hardship these high pump prices cause drivers who are dependent on driving to get to work or school.

**His bottom line conclusion is that American's desire inexpensive transportation, so they will choose that transportation option that fulfills their desire**

Mr. Lane decided to study the fluctuations in gasoline prices in 33 cities in the country that also have mass transit systems – buses and in some cases rail – and the impact they have on ridership. He was able to measure the impact on bus ridership in all 33 cities, but only 21 cities also have rail transit. His bottom line conclusion is that American's desire inexpensive transportation, so they will choose that transportation option that fulfills their desire. One might say that conclusion is pretty obvious because we don't know too many people who desire expensive transportation options over inexpensive ones. Everyone has alternative, and presumably more satisfying, uses for the extra cash they would have to lay out if they opted for the expensive over the inexpensive transportation option.

**For every 10% increase in fuel costs there was a corresponding increase in bus ridership of up to 4%, while there was a jump in rail travel of up to 8%**

What Mr. Lane did was measure the change in gasoline prices and the resulting change in mass transit ridership among the 33 cities. He found that over the period from January 2002 to March 2009, for every 10% increase in fuel costs there was a corresponding increase in bus ridership of up to 4%, while there was a jump in rail travel of up to 8%. His study led him to two conclusions. First, that there is elasticity between changes in gasoline pump prices and changes in mass transit ridership. Secondly, that there was a lagged effect in the elasticity, meaning that there was usually a passage of time between the change in gasoline prices and resulting change in consumer use of mass transit options.

**Exhibit 14. Elasticity of Bus Ridership**

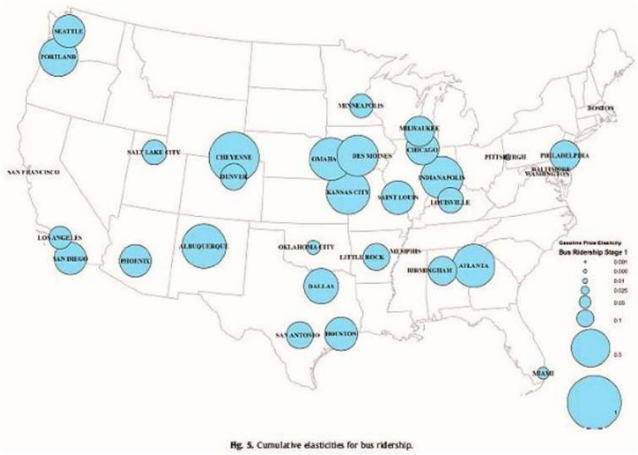



Fig. 5. Cumulative elasticities for bus ridership.

**Source: Lane, UT-El Paso**

**Fully one year following a price hike, mass transit use had increased by 64%**

According to the study, in Atlanta, Mr. Lane found that immediately after a gasoline price hike there was about a 20% increase in mass transit ridership. Six months after the price hike, there was an additional 32% increase in ridership and 11 months later the increase was an additional 12%. This means that fully one year following a price hike, mass transit use had increased by 64%. He found this big behavioral response to also occur in other cities he described as being auto-dependent, including Omaha, Des Moines,

Kansas City and Indianapolis. Mr. Lane said, "What that tells me is that there is actually a greater sensitivity to fluctuation of gasoline costs in cities that tend to be more auto-dependent. That to me is very interesting. People will go to transit even when there really isn't much transit to go to."

**Exhibit 15. Elasticity of Rail Ridership**

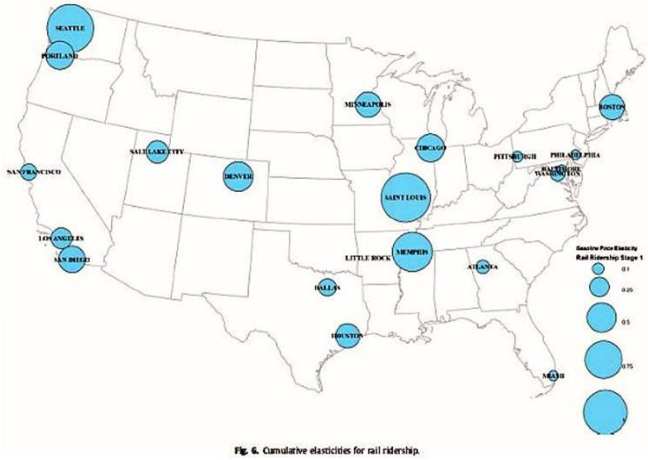



Fig. 6. Cumulative elasticities for rail ridership.

**Source: Lane, UT-El Paso**

**How much of the increase in ridership could be attributed merely to population growth rather than gasoline price hikes?**

As the full study has not yet been published, we need to be careful in our criticism. However, we were troubled by the absence in the précis of any mention of other key demographic or economic variables that could have influenced the results. First, in the case of Atlanta, during the decade 2000-2010, the city's population grew by 29%. How much of the increase in ridership could be attributed merely to population growth rather than gasoline price hikes? Without controlling for population growth, the results, although impressive on the surface, may not be statistically significant.

**Suburban and exurban employment centers are not typically well-served by mass transit even in places such as Chicago and Philadelphia that are rated as "good transit" cities**

Another issue is the small ridership numbers in many of the cities, which can make even a small increase in absolute numbers appear to be very large in percentage terms. In auto-dependent cities ridership tends to be made up of people with no other choice. This universe may have grown during the study time period because of the lack of income growth especially among the lower-income population. Additionally, suburban and exurban employment centers are not typically well-served by mass transit even in places such as Chicago and Philadelphia that are rated as "good transit" cities. Lastly, there is the issue of unused capacity for transit systems. While the study's calculation of mass transit ridership elasticity demonstrates a relationship, the ability to extrapolate that relationship may not hold. The expansion of mass transit routes requires significant capital investment and the addition of personnel. In other words, an expansion might not be a cheap alternative thereby negating the alternative for commuters supposedly fixated on cheap transportation.

**In Mr. Lane's judgment, if you increase gasoline prices while improving mass transit quality and availability, we might find out that America's love affair for automobile transportation may be based more on an artificially depressed market than a dedication to cars**

What the study did point out is that automobile use does not occur in isolation. Rather, it is tied to both the dynamics of gasoline prices and the quality and availability of mass transit systems. In Mr. Lane's judgment, if you increase gasoline prices while improving mass transit quality and availability, we might find out that America's love affair for automobile transportation may be based more on an artificially depressed market than a dedication to cars. As Mr. Lane put it, "We typically associate high automobile use in the U.S. with Americans' need to drive and love to drive. But ultimately there's a pricing and policy structure that enforces that. If we fully costed out some of the impacts on driving and had any inhibitions on car use — not to the level of inhibitions on public transit now; I'd never wish that on anybody — but simply had some way to make automobile travel more difficult and more expensive, and gave an alternative in the form of public transit or denser neighborhoods or shorter multimodal trips, then you could really see a pretty large change." Can one imagine TV's Mad Men trying to design an automobile advertising campaign based on the conclusions of this study?

## Canadian Power Exports Show Problem With Green Energy

**The IESO reported that the sale of this power generated $375.3 million, or about 3.38-cents per kilowatt-hour (kWh) of electricity sold**

A recent op-ed column in Canada's *Financial Post* newspaper showcased the fallacy of governments pushing a green power agenda on local ratepayers. The column was written by Parker Gallant, a retired banker who was motivated to conduct his analysis after examining his electricity bills and didn't like what he saw. Mr. Gallant lives in Ontario, a province in eastern Canada that in recent years has emphasized a green energy agenda for its power industry. Mr. Gallant points to a November 10th press release issued by the province's Ministry of Energy that said the Independent Electricity System Operator (IESO) sold 11.1 terrawatt-hours (Twh) of power to Quebec, New York, Michigan and other regions. That electricity would have powered about 25% of the province's homes and represented nearly 10% of total non-industrial electricity demand. The IESO reported that the sale of this power generated $375.3 million, or about 3.38-cents per kilowatt-hour (kWh) of electricity sold, which happens to be about half a cent above the 2.98-cents per kWh average price for power in Ontario province, according to Mr. Gallant's calculations. (All dollar amounts in this article are in Candian dollars.) That sure looks like the IESO was doing a good job of managing its power business.

**He estimates that the IESO is selling power for 3.4-cents per kWh that actually costs ratepayers about 7-cents per kWh, or at about a 4-cent per kWh loss**

Mr. Gallant estimates that the reality for Ontario ratepayers is considerably different. In fact, he estimates that the IESO is selling power for 3.4-cents per kWh that actually costs ratepayers about 7-cents per kWh, or at about a 4-cent per kWh loss. Based on the sale of 11.1 billion kWhs, the IESO actually lost about $420 million for its ratepayers rather than making money. How could that be you ask? Well, it all seems to be buried in the way the IESO is allowed to calculate its average cost of power versus its true cost, which just happens to be what ratepayers actually pay for their power.

As Mr. Gallant explains, on top of the reported ”market price” for electricity, IESO ratepayers must pay for Ontario’s multi-faceted and politically micro-managed power system. All those other costs are accumulated and calculated under an accounting concept called the “Global Adjustment” (GA), which according to the IESO includes “the rates paid to regulated and contracted generators and for conservation and demand management programs.” As Mr. Gallant is able to demonstrate, this phrase covers a multitude of hidden costs.

**We must add to the estimated average cost of electricity of 2.98-cents per kWh the additional cost of all the above-market power bought by the IESO**

We must add to the estimated average cost of electricity of 2.98-cents per kWh the additional cost of all the above-market power bought by the IESO. Wind generation is paid at 13.5-cents per kWh and solar at 80-cents per kWh. In addition, the power authority pays power producers to not produce power. If the wind is blowing and turbines are spinning producing electricity, the backup gas-powered plants are paid to not generate electricity.

The Ontario Power Authority reported that its GA account for the 12 months ending October 2011 totaled $5.1 billion, or nearly 30% of the system’s total revenues of $14.5 billion for that period. What makes up that GA account?

There are numerous private, non-utility generation (NUG) companies that hold long-term contracts to provide power to the system (hydroelectric, natural gas and biomass). Many of these are money-losing legacy contracts that the province is obligated to honor. They are held by an off-balance-sheet subsidiary called the Ontario Electricity Finance Corp. Total NUG payments last year are estimated at $1.06-billion.

Nuclear generation and certain hydroelectric power plants are guaranteed an average price of 5.58-cents per kWh, and receive a GA payment of $1.28-billion.The renewable energy special feed-in tariffs of 13.5-cents and 80-cents per kWh for wind and solar, plus the cost of paying standby gas plants to not produce electricity, accounts for the largest portion of the GA fund at $2.8-billion.

**Based on these GA costs, Ontario electric ratepayers were paying 3.6-cents per kWh in the form of a subsidy to the “surplus” power buyers outside the province**

Based on these GA costs, Ontario electric ratepayers were paying 3.6-cents per kWh in the form of a subsidy to the “surplus” power buyers outside the province. One has to wonder what the reaction of ratepayers would be if they truly understood the cost of their electricity and how their province’s green agenda was costing them dearly. Ontario is a province under significant financial stress due to the recession and financial crisis. By adopting an overly aggressive environmental philosophy for running the province and its power company, citizens are being unfairly squeezed. There is no easy way out of this mess, but by not being honest with the ratepayers, when the reality sets in that something has to be done, the reaction will not only be negative, but it may become vindictive.

**Contact PPHB:**
**1900 St. James Place, Suite 125**
**Houston, Texas 77056**
**Main Tel: (713) 621-8100**
**Main Fax: (713) 621-8166**
**www.pphb.com**

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