

MUSINGS FROM THE OIL PATCH

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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

Further Proof Of Industry Change Due To Era of Austerity

The changes reflect management views of the challenges in dealing with the capital cost/commodity price/investor return trifecta, as they assess their current and future potential business opportunities

Increasingly, energy news is full of articles highlighting steps companies are taking as they reassess how to more efficiently and effectively operate in the new Era of Austerity. The changes reflect management views of the challenges in dealing with the capital cost/commodity price/investor return trifecta, as they assess their current and future potential business opportunities. The magnitude of attention paid to these steps is quite different depending on investor and media assessment of how “out of the box” the changes undertaken are. For example, a couple of weeks ago the business world was buzzing about the pipeline and infrastructure empire restructuring announcement by Kinder Morgan (KMI-NYSE). On the other hand, little media attention was paid to Royal Dutch Shell’s (RDS.A-NYSE) decision to sell its producing acreage in Wyoming and Louisiana in exchange for cash and acreage in Pennsylvania at the same time. Not much media attention has been paid to A.P. Moeller- Maersk’s (Maersk.B-CO) decision to cut by a quarter its U.S. E&P staff by laying off 54 employees, and shifting exploration focus back to Copenhagen, Denmark, the home of the corporation. In Canada, the past month has contained many oil sands players announcing cutbacks in spending and delays in their decisions to develop new projects due to escalating costs and other internal issues at the companies.

The only reason oil prices are where they are is the geopolitical turmoil that has traders uneasy

A topic of growing interest for the industry is speculation about the future trend in global oil prices. There are numerous analysts suggesting that the only reason oil prices are where they are - \$102 for Brent and \$93 for West Texas Intermediate – is the geopolitical turmoil that has oil traders uneasy about the potential for further global supply disruptions, coupled with the substantial volume of crude oil already off the market due to violence. This school of thought suggests that the global economy is weakening as

Exhibit 1. Oil Prices Remain Remarkably Stable

Source: EIA, PPHB

demonstrated by the negative GDP growth for numerous countries in Europe, the slowing of growth in China and the sluggish U.S. economy. This means that oil demand may be falling such that any additional supply returning to the market will force oil prices down. Their only question is how far down prices may go and what will the energy companies do.

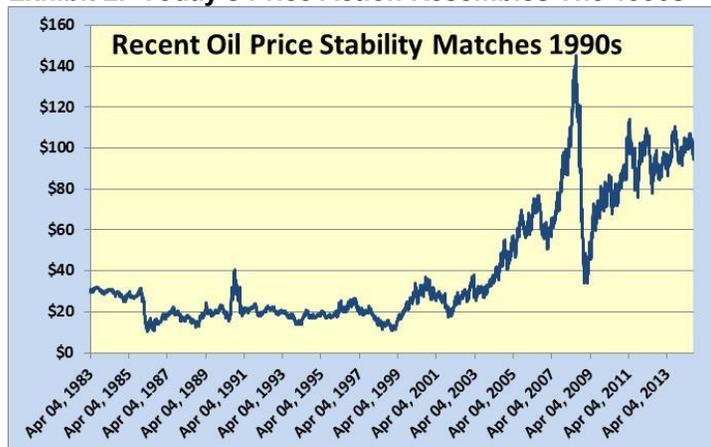
Some analysts suggest that the escalating cost of finding and developing new oil and gas resources will force commodity prices higher

On the other hand, some analysts suggest that the escalating cost of finding and developing new oil and gas resources will force commodity prices higher as that will be the only way the industry can be incentivized to bring new supplies into production to offset depletion of existing wells. These analysts see the current slow demand growth trend as providing the industry time to prepare for that next surge in global oil prices.

What went on during that period may be what we are starting to see now – restructuring of the oil and gas industry and its service and infrastructure sectors

What is confounding analysts is the degree of oil price stability that has existed for the past few years. That trend is shown clearly in Exhibit 1, and is evident especially since the start of 2011. We thought it would be interesting to examine this price stability phenomenon for a longer time period, shown in Exhibit 2 on the next page. That chart shows oil prices since spring of 1983 to now. It appears that the more recent years have been more volatile, but as we saw in Exhibit 1, that is not true for the past nearly four years. What is most interesting is the oil price stability that existed during the late 1980s and 1990s. What went on during that period may be what we are starting to see now – restructuring of the oil and gas industry and its service and infrastructure sectors.

After the oil price collapse in 1985, engineered by Saudi Arabia, the oil price was amazingly stable at around \$20 a barrel from 1987 through 1997, with the exception of the price spike associated with the First Gulf War in 1991. The economic damage done to the energy business as a result of the 1985 fall in oil prices was

Exhibit 2. Today's Price Action Resembles The 1990s

Source: EIA, PPHB

If one examines the structure of energy industry sectors at the end of the 1980s and again at the end of the 1990s, they will see that many of the players from the earlier years were gone – either liquidated or merged into other companies

This means that companies possibly need to assess their cost structures

tremendous. It took years for the industry to recover and sort out the bankruptcy of companies and the need for the industry to shrink and reorganize. If one examines the structure of energy industry sectors at the end of the 1980s and again at the end of the 1990s, they will see that many of the players from the earlier years were gone – either liquidated or merged into other companies. Much of the consolidation in that period was designed to eliminate competitors since there wasn't enough business to support multiple suppliers, thus enabling the surviving company to spread its overhead over more revenues in order to survive financially. It wasn't until much later in the 1990s and 2000s that the industry began focusing on changing their companies strategically to deal with new and more challenging business opportunities.

If we look at what is happening in the energy business now, it seems that companies are aggressively reassessing their business strategies in light of the possibility that commodity prices will remain stable for the foreseeable future. This means that companies possibly need to assess their cost structures and determine how they may want or need to reorient them to deliver increased value for their customers and shareholders. If we look at the actions of many of the companies, we see the emergence of new strategies.

In the oil sands, in May, Total SA (TOT-NYSE) announced that it had shelved its \$11 billion oil sands mine project to be done in conjunction with three partners. Imperial Oil Ltd. (IMO-AMEX) has struggled with cost overruns at its Kearl project and continues to struggle with cost efficiencies and disappointing production. Cenovus Energy (CVE-NYSE) has admitted to cost pressure issues with its Foster Creek oil sands facility, and Suncor Energy (SU-NYSE) has recently cut its capital budget by \$1 billion although it raised its oil price forecast. Suncor is also confronting questions about its safety management program as it has suffered four deaths at its various mines this year.

“Even with oil at more than C\$100 per barrel, some large producers have been cancelling projects because higher costs have crimped returns”

BP’s decision earlier this year to separate its U.S. onshore E&P operations into a new company in an effort to emulate the agility associated with successful independent operators

“We continue to restructure and focus our North America shale oil and gas portfolio to deliver the most value in the longer term”

A report by RBC Capital Markets in June pointed out that even steam assisted gravity drainage (SAGD) projects to extract oil sands from deeper depths that don’t permit surface mining are being challenged by cost increases and modest scheduling issues and delays. A study by Deloitte LLP pointed out that “Even with oil at more than C\$100 per barrel, some large producers have been cancelling projects because higher costs have crimped returns.”

Cost pressures are also being used as the reason why Maersk Oil & Gas, a subsidiary of A.P Moeller-Maersk of Denmark, has cut its U.S. staff by 70 employees, as reported by *Upstream*, and shifted exploration efforts back to the Copenhagen home office because of poor returns from U.S. efforts. The U.S. office will continue to work on development projects in the Gulf of Mexico and Angola. One could contrast that move with BP Ltd.’s (BP-NYSE) decision earlier this year to separate its U.S. onshore E&P operations into a new company in an effort to emulate the agility associated with successful independent operators in the shale plays. BP just named the new unit’s leader, David Lawler, the former chief operating officer of Sandridge Energy Inc., an independent founded by Tom Ward, a key E&P executive in the early successes of Chesapeake Energy (CHK-NYSE).

Shell Oil Co., the American subsidiary of UK/Netherlands-based Royal Dutch Shell (RDS), recently announced two deals – the sale of its 19,000 net acres of leasehold interest and more than 1,100 gross wells and associated facilities in the Pinedale field in Wyoming to Ultra Petroleum (UPL-NYSE), its partner in the field’s development, along with its 107,000 net acres in North Louisiana, as well as 418 producing wells, of which Shell was operating 193, to Vine Oil & Gas LP, a company formed by private equity firm Blackstone earlier this year. In return, Shell will receive \$925 million cash and 155,000 net acres in the Marcellus and Utica formations in Pennsylvania and \$1.2 billion in cash from Vine Oil.

What drove the deal, according to Shell Oil Co.’s President Marvin Odum was: “We continue to restructure and focus our North America shale oil and gas portfolio to deliver the most value in the longer term.” He went on to say, “With this announcement we are adding highly attractive exploration acreage, where we have impressive well results in the Utica, and divesting our more mature, Pinedale and Haynesville dry gas positions.” These transactions, coupled with the rumored sale of its onshore fields in Nigeria, would bring total divestments by RDS this year to about \$15 billion in furthering the effort of its new CEO, Ben van Beurden, to improve the company’s financial performance.

When he was appointed to head the company, following the surprise retirement of former CEO Peter Voser in response to RDS’s poor financial performance in recent years, Mr. van Beurden announced that he planned to pause the company’s capital spending program

In 2013, RDS spent its entire cash flow on projects, forcing it to borrow to pay its hefty dividend

while management reassessed its portfolio of projects seeking to boost future financial results. In 2013, RDS spent its entire cash flow on projects, forcing it to borrow to pay its hefty dividend. This condition was behind Mr. van Beurden's push to boost RDS' return on invested capital, cash flow and total shareholder returns. So far this year, financial results have improved, although given that RDS ended last year with a return on investment of 6.4% versus ExxonMobil's (XOM-NYSE) industry-leading 12.6% and Chevron's (CVX-NYSE) 10.4%, the company has a long way to go to close the gap.

In order to boost shareholder return, oil company managements will need to become more active in selling underperforming assets

As RDS is demonstrating, in order to boost shareholder return, oil company managements will need to become more active in selling underperforming assets or those with limited upside profitability and then reinvest that capital into projects possessing better expected profit potential. Also, managements must weigh these investment opportunities against the goodwill they may gain by returning some or all that capital to shareholders through increased cash dividends and share buybacks.

Mr. Kinder focused on shareholder returns as he and his partner built their empire partly because he was the company's largest shareholder

In terms of rewarding shareholders with performance and dividends, until recently, Kinder Morgan had been the poster child. The empire has been headed by Rich Kinder, the former number two at Enron who left after being passed over for the top spot, who joined with a partner and purchased pipeline assets Enron was divesting in its effort to create the "asset-lite" energy company that eventually imploded. Mr. Kinder focused on shareholder returns as he and his partner built their empire partly because he was the company's largest shareholder, currently at 24%. Over the years, Kinder Morgan created multiple companies within its empire, each designed to be the ideal vehicle for transporting and processing petroleum products in the most tax-efficient and shareholder-friendly structure – primarily master limited partnerships (MLPs) where cash earnings are passed directly through to the unitholders who are then responsible for paying taxes on their distributions.

The challenge is that these projects have regulatory approval hurdles and escalating costs that could limit growth for the companies within the existing empire of Kinder Morgan

Over the years, the Kinder Morgan empire grew through investments and asset purchases, but its byzantine corporate structure and sheer size caused investors to begin questioning the ability of the empire to continue growing its cash flows, and in turn, its distributions. The decision to restructure Kinder Morgan's empire reflects what Mr. Kinder sees as its next business opportunities. Those are related to the need for new energy infrastructure in light of the shale revolution. Those opportunities will require significant new investment, which should earn meaningful future profits. The challenge is that these projects have regulatory approval hurdles and escalating costs that could limit growth for the companies within the existing empire of Kinder Morgan. By restructuring the empire into one company that will become the third largest energy company in terms of market capitalization, Kinder Morgan will be better able to compete for these new business opportunities. A recent study conducted for the

Over 2014-2035 the gas industry alone will need to invest \$313.1 billion in new infrastructure projects

Interstate Natural Gas Association of America showed that over 2014-2035 the gas industry alone will need to invest \$313.1 billion in new infrastructure projects, up from the organization's previous study's estimate of \$213.3 billion needed for projects in 2011-2035. Other estimates have suggested that energy infrastructure capital investment needs may be as high as \$640 billion over the next 20 years.

These conditions may mean that Kinder Morgan's growth will depend more on acquisitions than new construction projects

As we see greater opposition to new infrastructure investment, either due to new regulatory requirements or public concerns, these large capital projects are taking longer to build (see the Keystone XL pipeline approval and the Algonquin pipeline expansion) and are proving to be more costly to construct. These conditions may mean that Kinder Morgan's growth will depend more on acquisitions than new construction projects, even though the company is already among the largest owners of pipelines in North America.

The importance for the petroleum industry is that this restructuring is pointing the way for how capital may need to be reorganized for the industry to successfully provide the necessary infrastructure to handle America's future energy needs

Over the years, Mr. Kinder has been willing to reorganize his business to capitalize on the investment wave of the day – MLPs, going private in 2006 and then public in 2011, and now reorganizing into a C-corporation. Yes, most of these shifts have benefited Mr. Kinder personally but shareholders have benefitted, also. This latest move may not be as well-received as prior moves due to the taxable nature of the transaction and the fact that the cash component to be paid to shareholders will not cover their likely tax obligation. The deal will happen due to Mr. Kinder's ownership, but the importance for the petroleum industry is that this restructuring is pointing the way for how capital may need to be reorganized for the industry to successfully provide the necessary infrastructure to handle America's future energy needs.

The Maersk Oil & Gas, oil sands companies, RDS and Kinder Morgan moves in recent weeks highlight how managements are beginning to recognize that the future for the petroleum industry will be different from its past. Managements that plan to lead the industry of the future in this Era of Austerity will need to re-examine their businesses with a critical and unbiased eye, much as they did in the 1990s. For the petroleum industry, the new era means this is "no longer your grandfather's business."

Environmentalists Disrupt Efforts To Boost NE Gas Supply

Two weeks ago last Saturday, a group of residents led by an environmental activist marched in Burrillville, Rhode Island protesting plans by Spectra Energy (SE-NYSE) to expand the delivery capability of its Algonquin pipeline system that supplies gas to the state and other New England states. Actually, the physical expansion of the pipeline will occur elsewhere, but Spectra Energy operates a compressor plant in Burrillville, one of five it operates along the pipeline, all of which it needs to upgrade in order to move

The Burrillville compressor plant has been operated for 60 years without any issues with its neighbors

greater volumes of gas through the line into Massachusetts. The Burrillville compressor plant has been operated for 60 years without any issues with its neighbors. The Algonquin expansion is before the Federal Energy Regulatory Commission (FERC) awaiting approval, but just recently the commission issued a draft environmental impact statement (DEIS) on the project.

Exhibit 3. Algonquin Pipeline To Be Expanded



Source: Spectra Energy

The DEIS stated that “FERC’s environmental staff concludes that construction and operation of the Project [Algonquin expansion] would result in some adverse environmental impacts. However, most of these impacts would be reduced to less-than-significant levels with the implementation of Algonquin’s proposed mitigation measures and plans and the additional measures recommended by the FERC staff in the draft EIS.” The primary reasons for approving the plan is that virtually all the pipeline work will occur within or adjacent to the company’s right-of-way. In addition, Spectra Energy would comply with a raft of federal rules and procedures for building pipelines, all of which would mitigate any possible environmental concerns.

The effort to fight the compressor station upgrade has involved door-to-door campaigning by a group of bicycle-riding college students from Climate Summer, an internship for organizing against natural gas projects

The opposition to the expansion, and the upgrading of the compressor station, is being led by Burrillville Against Spectra Expansion with the assistance of the group Fighting Against Natural Gas (FANG). The *Providence Journal* wrote a couple of articles about the protests and one profiling the lead activist, Nick Katkevich, who it initially identified as from out of state, but which subsequently corrected that characterization after interviewing him and finding out that he had moved back to the state last February. The effort to fight the compressor station upgrade has involved door-to-door campaigning by a group of bicycle-riding college students from Climate Summer, an internship for organizing against natural gas projects, multiple public forums, a float in Chepachet’s Ancients & Horribles Parade and an online petition against the compressor station upgrade with 100 signatures that has grown to 147 following the publicity of the newspaper articles. Burrillville has a population of 15,955 according to the 2010 Census.

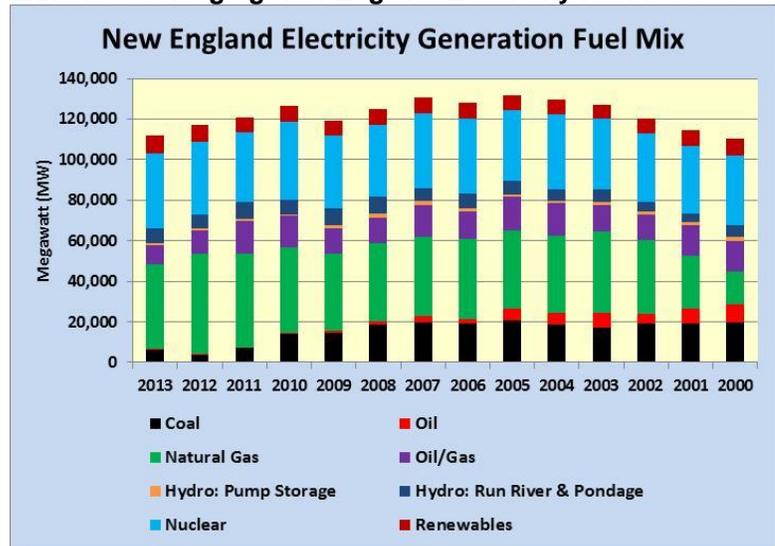
“We wanted to make sure when these coal plants closed they weren’t replaced by gas, another fossil fuel”

Last year, natural gas became the most important fuel for generating electricity

Mr. Katkevich joined with others to form Fossil Free Rhode Island to pressure institutions to stop investing in coal businesses. As result, he was pleased at the announcement that Massachusetts’ Brayton Point, the largest coal-fired plant in New England, would shut down in 2017. Almost all the power in Rhode Island is generated from natural gas. Mr. Katkevich said that he and his activist colleagues in the Northeast “decided on fighting against natural gas. We wanted to make sure when these coal plants closed they weren’t replaced by gas, another fossil fuel.” The opposition to natural gas is also a fight against hydraulic fracturing because the technology is critical to developing the gas resources to feed the region’s power and heating markets.

To understand the importance of natural gas to the New England region, the chart in Exhibit 4 shows the change over time (2000-2013) of the fuels used to generate electricity. The chart shows how significant natural gas has become as a fuel in the region. In 2000, coal was more important to the electric industry than natural gas, but nuclear was the most important fuel overall. Last year, natural gas became the most important fuel for generating electricity. Coal’s contribution jumped up last year due to utilities attempting to avoid high-priced natural gas during the early months of the winter of 2013-2014. The contribution of renewables, including both forms of hydropower, remained about the same in 2013 as it was in 2000, which is somewhat surprising given New England’s push for greater use of renewables to generate power.

Exhibit 4. Changing New England Electricity Fuel Mix



Source: ISO – New England

Opposition to expanding natural gas supply and importing more renewable power into New England has upset a move announced last January by the six New England governors to push for

The governors were reacting to the spike in power prices during the polar vortex event that forced utilities to use more coal and oil

expansion of natural gas pipeline capacity in the region and building at least one major electric transmission line to bring renewable energy from Canada. The governors were reacting to the spike in power prices during the polar vortex event that forced utilities to use more coal and oil, considerably dirtier fuels than burning natural gas. A feature of the governors' plan was for the states to seek a federally imposed energy fee to be assessed on consumers, which would promote a faster shift toward cleaner energy in the region.

The governors' plan appears to be dead as the Massachusetts Legislature recently rejected a so-called clean energy bill offered by Gov. Deval Patrick

The governors' plan appears to be dead as the Massachusetts Legislature recently rejected a so-called clean energy bill offered by Gov. Deval Patrick (Dem). The bill contained a provision that would have allowed utilities to sign contracts for hydropower from Canada, a measure opposed by Massachusetts power generators. At the same time, public opposition to a new natural gas pipeline proposed by Kinder Morgan (KMI-NYSE) to bring Marcellus gas into the western part of Massachusetts has grown.

The Maine Public Utilities Commission is hearing a case to determine whether the state and its power customers should help subsidize the regional energy effort, and to what degree. While a decision is expected this fall, the Massachusetts developments may force Maine to figure out what it can do on its own. To understand the problems the New England region has with its power market, one only needs to look at what happened during last winter's bitter cold period. A blog, *Yes Vermont Yankee*, had an interesting analysis of the power market situation in New England last January and the future impact that the closure of the Vermont Yankee nuclear power plant will have on the regions' power market and electricity cost.

Thus, during the cold snap, Vermonters paid 54% more for residential power and a whopping 87.5% more overall

When the polar vortex hit the region, due to the dramatic increase in electricity demand, coupled with the sharp rise on natural gas prices, electricity prices spiked. An exhibit from the blog showed power prices in Vermont for one day during that cold period in January. The \$274.12 price translates into 27.41 cents per kilowatt hour (kWh). That price compares to the average residential price in Vermont in 2013 of 17.77 cents per kWh and an overall price for all customers in the state of 14.62 cents per kWh, according to *ElectricChoice.com*. Thus, during the cold snap, Vermonters paid 54% more for residential power and a whopping 87.5% more overall.

At the same time that nuclear and gas were accounting for 55% of the power supply that January day, coal generated 13% and oil produced 18%

On the same day that the power price spiked to 27.41 cents per kWh, the fuel supply for power generation showed a significant shift from normal. As shown in Exhibit 6 on the next page, nuclear power and natural gas accounted for nearly equal shares of the power generation market in New England according to ISO-NE. For the past couple of years, natural gas has generated 50% or more of the power in New England. (Exhibit 7 on page 11.) At the same time that nuclear and gas were accounting for 55% of the power supply that January day, coal generated 13% and oil produced 18% of the

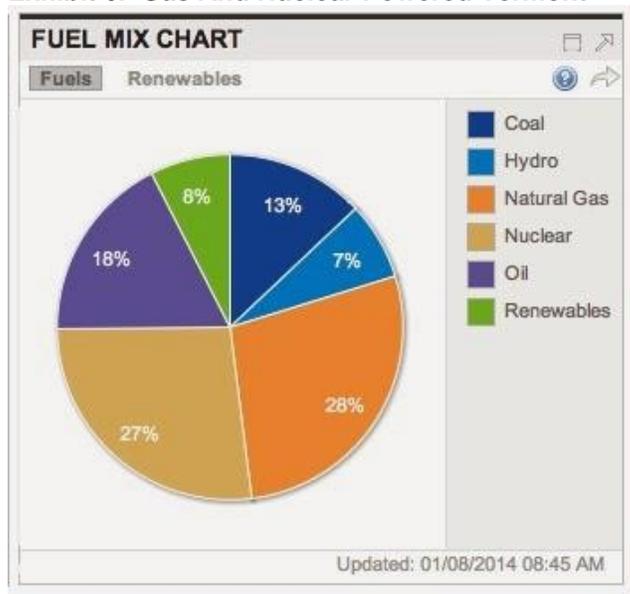
Exhibit 5. Vermont Power Price In January 2014



Source: Yes Vermont Yankee

daily power supply. The ISO-NE, the region’s power system monitor, had arranged for \$75 million in capacity payments to oil-burning utilities to maintain supplies of oil on site in this eventuality. That appears to have been a smart management decision by the operator of the power grid.

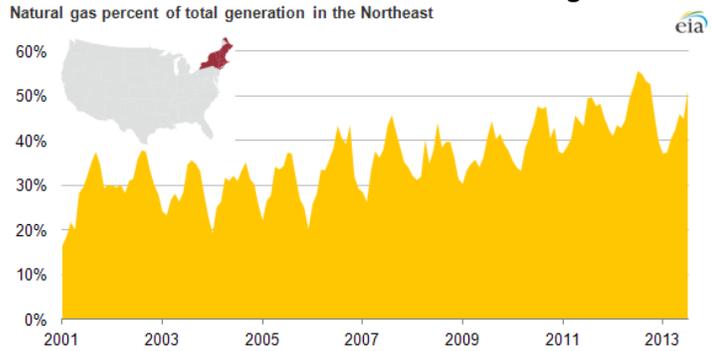
Exhibit 6. Gas And Nuclear Powered Vermont



Source: Yes Vermont Yankee

At the same time the utilities were burning more coal and oil, ISO-NE told all utilities in the region to cease any maintenance work in order to be ready to generate more power and to be ready to ship power to adjacent power grids if needed.

Exhibit 7. Natural Gas Powers Northeast Region

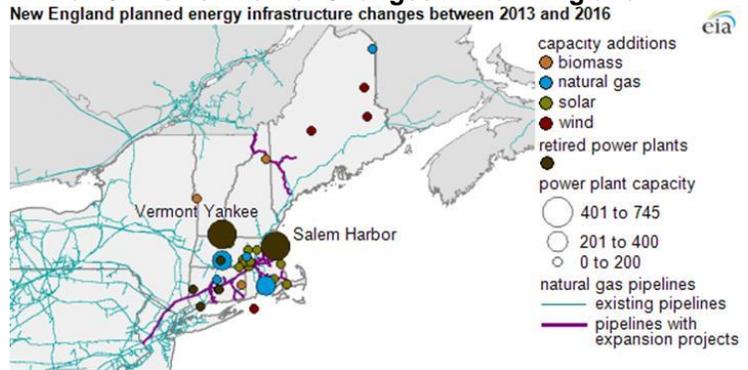


Source: EIA

That will force utility operators, and the ISO-NE, to plan on using more oil-fired and coal-fired power plants in the winter

What has become evident to utilities and now the governors in the region is that the lack of natural gas pipeline capacity has restricted the amount of gas that is available for generating power during periods of severely cold weather. It was that situation that prompted the governors to join together to promote the pipeline expansion. The problem, however, is that the closure of Massachusetts' Brayton Point coal-fired power plant and the eventual closing of the Vermont Yankee nuclear plant will put the New England region at a higher risk of power price spikes and even power shortages if adequate gas supplies cannot reach the region. That will force utility operators, and the ISO-NE, to plan on using more oil-fired and coal-fired power plants in the winter.

Exhibit 8. Power Market Changes In New England

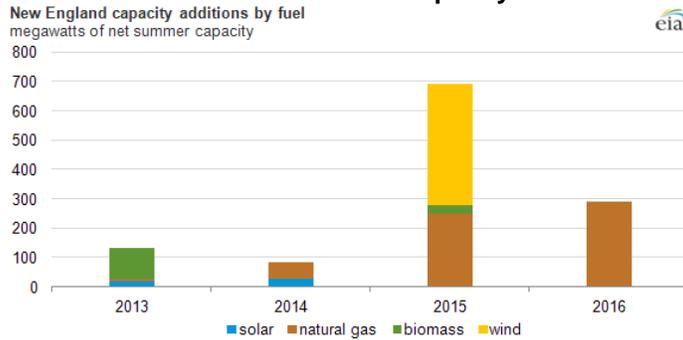


Source: EIA

Interestingly, the power industry is planning on adding more gas-fired generating capacity in the region as shown in Exhibit 9 on the next page. Over 2014-2016, new natural gas power generation will account for more than half the generating capacity planned to be

added. Wind power will be the next largest component added with solar and biomass accounting for the balance. Some of this future gas-fired generating capacity is probably represented in the firm capacity agreements held by Algonquin that underlie its pipeline capacity expansion.

Exhibit 9. Planned Generation Capacity Additions

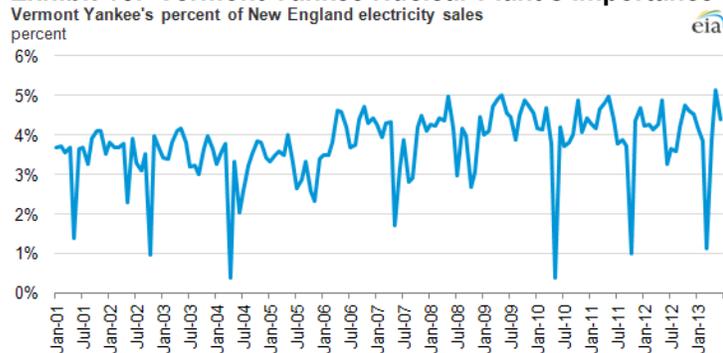


Source: EIA

Vermont Yankee has consistently supplied 4-5% of the electricity produced in the region

For many in the region, concern is growing over the impending closure of the 41-year old, 604-megawatt Vermont Yankee nuclear plant that will occur at year end when its fuel cycle is complete. Vermont Yankee has consistently supplied 4-5% of the electricity produced in the region. The importance of that power was shown during the polar vortex event when Vermont Yankee, along with the few other nuclear power plants, produced 27% of the region's electricity.

Exhibit 10. Vermont Yankee Nuclear Plant's Importance



Source: EIA

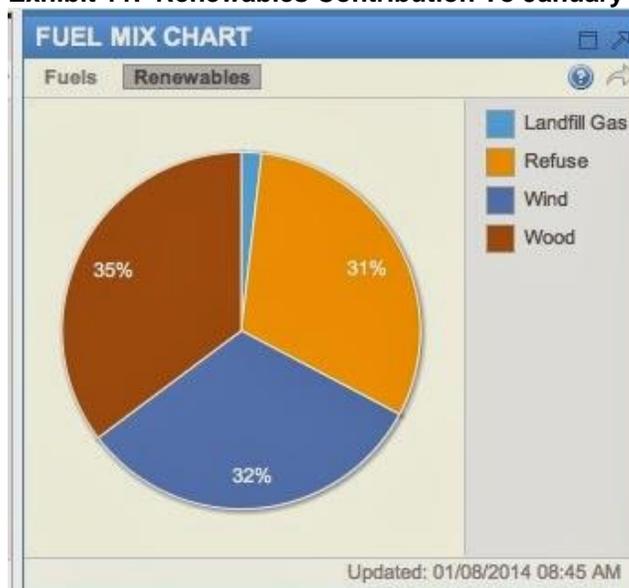
As natural gas becomes more important to the energy supply of New England, the number of people who want to fight the use of any fossil fuel, even the cleanest one, is growing

As natural gas becomes more important to the energy supply of New England, the number of people who want to fight the use of any fossil fuel, even the cleanest one, is growing. These people wish to see the use of more renewable fuels. New England has several senators who are leading that charge including Sen. Sheldon Whitehouse (D-RI), Sen. Ed Markey (D-MA) and Elizabeth Warren (D-MA). Sen. Warren recently wrote an op-ed that was published in *The Berkshire Eagle* that stated, "Before we sink more money in gas

Nearly half the new electricity generation capacity planned to be built in New England over the next few years will be wind, solar and biomass

infrastructure, we have an obligation wherever possible to focus our investments on the clean technologies of the future – not the dirty fuels of the past - and to minimize the environmental impact of all our energy infrastructure projects.” In that regard, as shown above, nearly half the new electricity generation capacity planned to be built in New England over the next few years will be wind, solar and biomass. But how much did these fuels contribute during last January’s polar vortex event?

Exhibit 11. Renewables Contribution To January Power



Source: Yes Vermont Yankee

Wind represented 32% of the renewables contribution, or about 2.6% of the total amount of power generated

On that bitter cold January day, renewables supplied about 8% of the power generated in New England. The breakdown of the renewables contribution is shown in Exhibit 11. Wind represented 32% of the renewables contribution, or about 2.6% of the total amount of power generated ($0.32 \times 0.08 = 0.026$). Even with all the wind power generation capacity planned to be added in the region, it is impossible to see how renewables will be able to support the local economy. The wind power capacity to be added in 2015 includes the region’s two developing offshore wind farms – Cape Wind in Nantucket Sound off Massachusetts, and Deepwater Wind offshore Block Island, Rhode Island. While they will add additional power generating capacity, it will be expensive power.

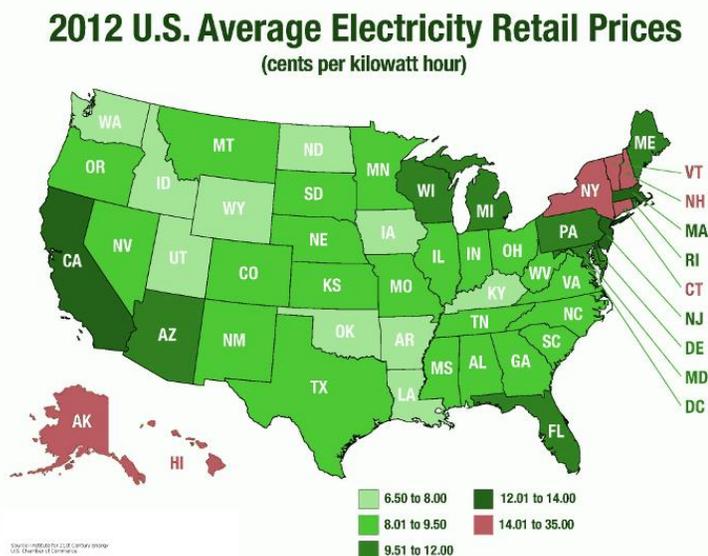
In Rhode Island, Deepwater Wind secured a PPA with the state’s primary power supplier at a price of 24.4 cents per kWh with a 3.5% escalation for 20 years

The Cape Wind project negotiated a power purchase agreement (PPA) with the local utility at 18.7 cents per kWh with an annual 3.5% escalation for 15 years. In Rhode Island, Deepwater Wind secured a PPA with the state’s primary power supplier at a price of 24.4 cents per kWh with a 3.5% escalation for 20 years. These prices compare to Massachusetts 2013 average residential power price of 15.86 cents per kWh and an average power price for all

The cost of electricity from these offshore wind farms will be substantially above the average price of electricity in the states

consumers of 14.93 cents per kWh. The same categories in Rhode Island were 16.90 cents and 14.63 cents per kWh, respectively. The cost of electricity from these offshore wind farms will be substantially above the average price of electricity in the states, and given the guaranteed price escalations, will always be more expensive. Exhibit 12 shows a map of the range of power prices for every state in 2012 and highlights how expensive power is in the New England region even without the offshore wind farms being in operation.

Exhibit 12. New England Has Expensive Power



Source: *ElectricChoice.com*

The state’s Public Utility Commission demanded that the utilities secure their clean energy from in-state generators, eliminating the cheaper alternatives

When we look at what has happened to average power prices in the New England states for 2013, only Maine remains below 14.01 cents per kWh, which is largely due to the state’s use of wind power and cheaper hydropower from Canada. In fact, utilities in Massachusetts fought against the Cape Wind PPA because they were able to secure clean power (wind and hydro) from generators in Maine and Canada at lower prices, but the state’s Public Utility Commission demanded that the utilities secure their clean energy from in-state generators, eliminating the cheaper alternatives and ensuring that Massachusetts electric customers will pay higher prices in the future, especially with the guaranteed annual escalation factor.

Renewables are more expensive than any of the other fossil fuel power sources

As we wrote in our last *Musings*, a new study shows that even after costs are adjusted for the benefits of emission reductions, the intermittency of wind and solar and the cost of the standby power resources required, renewables are more expensive than any of the other fossil fuel power sources. The fight by activists to stop the expansion of natural gas pipelines and to force the shutdown of fossil fuel-powered and nuclear plants will lead to New England having even more expensive electricity in the future than it does

presently. While we have not seen any studies proving it, we believe that high power costs are contributing to the slow pace of economic recovery in the New England region. The prospect of higher future power prices is not positive for the outlook for New England.

Is Canada Finally Seeing The Light On Energy?

Various energy companies were employing former politicians, bureaucrats or First Nations' executives to help promote major energy infrastructure projects

A recent article in Canada's *Financial Post* highlighted the decision by Stockwell Day, the former Canadian international trade minister and former Alberta treasurer, to join Pacific Future Energy Corp. as a senior advisor, director and chair of the company's advisory committee. The Vancouver-based company is backed by Mexico's Grupo Salinas and is proposing to build a C\$10 billion refinery on the coast of British Columbia. The thrust of the article was about how various energy companies were employing former politicians, bureaucrats or First Nations' executives to help promote major energy infrastructure projects.

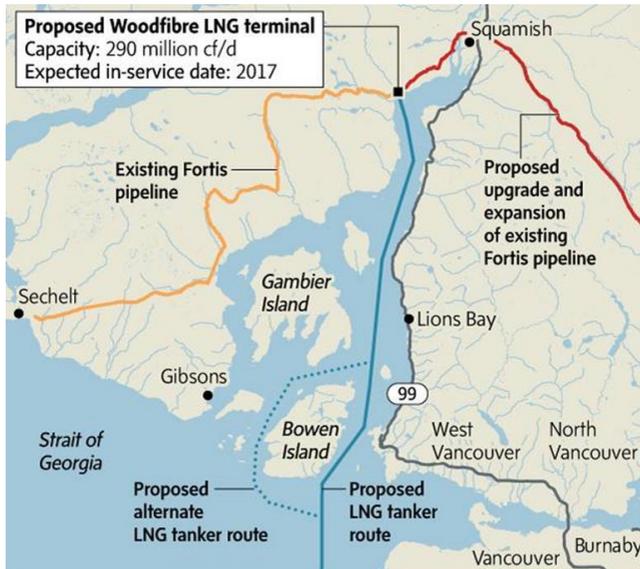
The idea for a refinery is that rather than exporting oil sands bitumen that sells at a low price and has citizens fearful of the environmental damage from a bitumen-laden tanker accident, by refining the oil the value of that barrel will be much greater, while the environmental risk is considerably lower

We were intrigued by the fact that more projects appear to be on the boards that could enable Canada to begin accessing world markets for its energy resources. The Pacific Future refinery proposal is one of three being discussed for B.C. The other proposals are being floated by B.C. newspaper magnate David Black and aboriginal businessman Calvin Helin. The Pacific Future refinery is designed to be built in modules of 200,000 barrels per day capacity up to a maximum of one million daily barrels. The idea for a refinery is that rather than exporting oil sands bitumen that sells at a low price and has citizens fearful of the environmental damage from a bitumen-laden tanker accident, by refining the oil the value of that barrel will be much greater, while the environmental risk is considerably lower. The increased environmental risk from a spill is a reason why Enbridge's (ENB-NYSE) Northern Gateway oil line through B.C. is being fought by local residents. On the other hand, the battle with the United States over approval of the Keystone XL pipeline may have finally convinced Canadians that they need to work harder to access other markets for the country's oil and gas or their economy will fail to grow as anticipated.

It is thought that there is capacity for only three terminals – two at Kitimat and one at Rupert, although it is possible that a smaller fourth terminal might be built

The landscape for exporting western Canadian natural gas is also changing. There are 14 LNG terminals proposed for the coast of British Columbia, seven of which have been granted export permits by the Canadian government. It is thought that there is capacity for only three terminals – two at Kitimat and one at Rupert, although it is possible that a smaller fourth terminal might be built such as Woodfibre LNG, proposed for Squamish near Vancouver. West Coast Canada LNG, the Exxon Mobil Canada/Imperial Oil Ltd. joint venture, in Prince Rupert harbor is considered the favorite in that region. At Kitimat, the three terminals furthest along in development include Pacific NorthWest LNG headed by Malaysia's Petronas, LNG Canada, a venture led by Shell Canada Energy, and Kitimat

Exhibit 13. Canada's First LNG Terminal?



THE GLOBE AND MAIL » SOURCE: WOODFIBRE LNG
Source: The Globe And Mail

LNG, a joint venture of Chevron and Apache Corp. (APA-NYSE). The future of the latter project is questionable since Apache, under pressure from an activist shareholder has announced its exit from the venture, plus the project has yet to secure any Asian customers for its LNG. The other two Kitimat terminals already have Asian customers.

Exhibit 14. Canada's Proposed LNG Terminals

- BRITISH COLUMBIA**
 All 14 projects are in the proposal stage. Canada's National Energy Board has issued export licences to the first seven listed here.
1. Kitimat LNG
 2. Douglas Channel Energy
 3. LNG Canada
 4. Pacific NorthWest LNG
 5. West Coast Canada LNG
 6. Prince Rupert LNG
 7. Woodfibre LNG Export
 8. Triton LNG
 9. Aurora LNG
 10. Kitsault LNG
 11. Woodside LNG
 12. Discovery LNG
 13. Stewart Energy
- Steelhead LNG: Site to be announced



JOHN SOPRINSKI AND BRENT JANG/THE GLOBE AND MAIL » SOURCES: RBC DOMINION SECURITIES INC., THE GLOBE AND MAIL, NATIONAL ENERGY BOARD, B.C. GOVERNMENT
Source: The Globe And Mail

While some analysts are optimistic that LNG will be exported in 2017, we think 2018-2020 is a more realistic timeframe

The LNG industry still needs clarity about taxes from B.C. along with securing the rights of way to build pipelines to haul both B.C. and Alberta natural gas to the terminals. While some analysts are optimistic that LNG will be exported in 2017, we think 2018-2020 is a more realistic timeframe. If it is any later, there is risk there will be too much LNG export capacity in the world that will alter the nature of the global LNG market, possibly eroding its current high profitability. We are encouraged that Canada appears to have begun to get its act together for developing projects to tap global markets for the nation's energy resources. These projects will be very important for the long-term future of the Canadian economy.

A Positive Outlook For Wind And Offshore Wind Generation

Measured by the growth in the global cumulative installed wind generating capacity, the five year average increase was 21.4%

A recent report and webinar by Navigant Research about the outlook for wind generation, especially for the offshore segment, has a positive tone, but there was one surprising note. Over 2008-2013, according to Navigant, the average growth rate in the annual megawatts (MW) of new global wind generation capacity added was 5.1%, despite the decline in the most recent year's capacity added due to the ending of the production tax credit (PTC) in the United States. Measured by the growth in the global cumulative installed wind generating capacity, the five year average increase was 21.4%.

The research firm sees a 33% annual average growth in megawatts of new wind power generating capacity over the forecast period

Due to the ending of the PTC in the United States, many wind projects being planned or contemplated stopped due to the uncertainty of a tax credit extension. The PTC has not been extended, but one offset to a total collapse in new capacity additions was that the 2.3 cents per kilowatt-hour of wind power generated tax credit remains available to projects through the end of 2015 if the project was started before the end of 2013. The Internal Revenue Service decided initially that 5% of the value of the project needed to have been spent by December 31, 2013, in order to qualify for the PTC, but in recent weeks they revised that threshold down to 3% for the project to be eligible. While what happens after 2015 remains uncertain for a further extension of the tax credit, the restructuring of the PTC in 2013 has boosted Navigant's estimate for wind generation capacity growth in the early years of its 2013-2018 U.S. forecast but less after 2015. The research firm sees a 33% annual average growth in megawatts of new wind power generating capacity over the forecast period, but a substantial amount of that growth is projected in this year and next. Navigant sees 6,300 MW of new wind power generating capacity to be added this year and 5,766 MW of wind power onshore and 234 MW offshore to be installed in 2015. Those estimates compare to 1,084 MW installed in 2013. Onshore wind power projected to be installed drops roughly in half in 2016 but then grows to about 3,500 MW for both 2017 and 2018. The most surprising aspect of the U.S. forecast to us is that Navigant projects 1,006 MW of offshore wind generating capacity to be installed in 2018 after a total of 622 MW for all previous years.

Estimates are that the fees and leases for a turbine average \$6,000-\$10,000 per acre per year, which is often more than any agricultural crop will produce

A major driver for new U.S. onshore wind generating capacity has been the \$7 billion expansion of the power transmission system within Texas, which has led to the state becoming the largest wind power generator in the nation. Also, the state currently is planning on adding 8,300 MW of new wind power out of the total wind industry's new generating backlog of 14,300 MW. Outside of Texas, Iowa has rapidly become one of the top wind producing states not only because wind conditions are attractive, but also because the leases for turbine locations have become the best cash crop the state's farmers can enjoy. Estimates are that the fees and leases for a turbine average \$6,000-\$10,000 per acre per year, which is often more than any agricultural crop will produce. In fact, when we were in Europe, we met an Iowa farmer who commented about how happy the farmers were with their wind turbine leases.

Individual state RPS set requirements for how much power generated from renewables – wind, solar, hydro and biomass – must be purchased by the local utilities

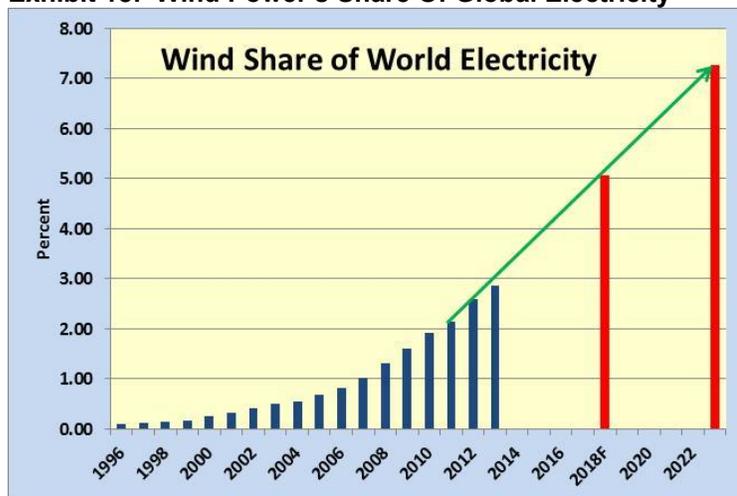
U.S. wind power growth has been driven by two factors – the renewable portfolio standards (RPS) enacted by states and the PTC. Individual state RPS set requirements for how much power generated from renewables – wind, solar, hydro and biomass – must be purchased by the local utilities. Another driver has been the PTC. The PTC can only be taken against "passive income," which is income from other investments. Private equity firms often put together investors who need a tax write-off courtesy of the PTC. It is also used by corporations who invest in wind farms. As Berkshire Hathaway's CEO Warren Buffett admits, he uses the PTC to lower his company's taxes. As he put it, "we get a tax credit if we build a lot of wind farms. That's the only reason to build them." That may be a reason why politicians want to see the PTC extended.

While they only see China's wind power capacity growing 4% per year, they project India's growing at 13%, the UK's market expanding at 10% and Brazil's increasing at 15% per year

Based on Navigant's assessment of market conditions around the world for new wind power, the firm believes the next five years will see an average of about a 9% annual growth in new generating capacity additions. When they presented some of their country forecasts, most showed very significant growth over 2013-2018. While they only see China's wind power capacity growing 4% per year, they project India's growing at 13%, the UK's market expanding at 10% and Brazil's increasing at 15% per year. It was interesting that Navigant's outlook for the German wind power market calls for it to shrink by 2% per year. One has to think that this forecast reflects the surge in wind generating capacity over the past several years due to the country's Energiewald energy program that called for replacing its nuclear energy plants with renewables, which was supported by a significant increase in renewables subsidies. Unfortunately, the outcome of that energy plan has created severe financial problems for German residents and has nearly destroyed the nation's electric utilities. The German government is now revising the program. An unintended consequence of the original energy plan was that German utilities resorted to burning more cheap coal in order to keep the grid from crashing from surges of intermittent power and their power plants operating profitably. The result is that carbon emissions have

Increased, thus wiping out several years of the government's prior efforts to reduce greenhouse gas emissions.

Exhibit 15. Wind Power's Share Of Global Electricity



Source: Navigant Research, PPHB

From a 2.9% share of world electricity output from wind in 2013, Navigant projects the share will climb to 5% in 2018 and 7.3% by 2023

Wind power's contribution to global electricity has grown dramatically over the last 18 years as shown in Exhibit 15. The acceleration in wind power's growth, largely driven by government mandates and subsidies, is projected to continue to grow at the rate of increase of the past several years. From a 2.9% share of world electricity output from wind in 2013, Navigant projects the share will climb to 5% in 2018 and 7.3% by 2023. That is impressive growth, but considering that the proponents of renewables believe that green power can eventually displace all fossil fuels used to generate electricity, Navigant's forecast for the rate of growth means we are decades away from wind fulfilling that role. That means renewables will do little to save the world from the damages of climate change.

Exhibit 16. Installed Offshore Wind Power Capacity

Offshore Wind Generating Capacity		
Country	MW	Pct. Of Total
United Kingdom	3,666	54.0%
Denmark	1,233	18.0%
Belgium	566	8.0%
Germany	508	7.0%
China	356	5.0%
Netherlands	247	3.6%
Sweden	211	3.0%
All others	45	0.7%
Total	6,832	100.0%

Source: Navigant Research, PPHB

By the end of 2014 the U.S. government will determine all those areas of our East Coast offshore waters where wind farms can be developed

With respect to the offshore wind segment, Navigant says that as of 2013 there is 6,832 MW of wind generating capacity installed. Navigant sees this segment continuing to grow. In its regional forecasts, offshore wind growth will be largely focused in the UK and China with Germany and the U.S. also contributing. An interesting development is that by the end of 2014 the U.S. government will determine all those areas of our East Coast offshore waters where wind farms can be developed. At the same time, the shipping industry and the Navy must determine where shipping routes will be located since there will not be another chance to reposition them for several decades until these wind farm areas are developed or abandoned. The issue of shipping routes into the U.S. was a point we made in several earlier articles about the U.S. offshore wind industry. We were unaware of this deadline, but since the comment came from a person involved in preparing the annual offshore wind studies for the Department of Energy, we assume the deadline exists. We further assume that the areas dedicated to offshore wind farms will not consume all of our offshore waters despite academic studies suggesting that we can power our economy totally by offshore wind if we plant wind turbines up and down the coast in lines spanning a swath five to eight miles wide.

The average cost of offshore wind is 19 cents per kWh or more, which is over two times the cost of onshore wind

One of the major problems with the offshore wind scenario was the acknowledgement by the experts that the average cost of offshore wind is 19 cents per kWh or more, which is over two times the cost of onshore wind. Moreover, natural gas power is currently less than half that cost. Despite these economics, wind power will be promoted because it represents clean energy and it has government mandates and tax subsidies associated with it. Until there are major breakthroughs in battery storage, wind power will remain a challenge for utilities operating the grid. Our conclusion is that we will see more wind turbines and pay higher electricity costs. Hopefully, power rationing doesn't become the alternate to failure to improve energy storage.

Renewables: Not Only Expensive, But Possibly A Bird Killer

The concentrated reflected sun's rays have become a laser that roasts everything and anything in its way including insects and birds flying through the area

Uh-oh! Inspectors with the U.S. Fish & Wildlife Service are urging California officials to stop BrightSource Energy from building a bigger version of its state-of-the-art solar plant at Ivanpah in the Mojave Desert. The reason the Feds are urging the halt is because they have discovered that the plant, with 300,000 motorized mirrors the size of garage doors that reflect the sun's rays onto three boiler towers each standing 400 feet tall, has been killing birds. The water inside the towers is heated by the 800 degrees Fahrenheit reflected rays to produce steam, which turns turbines that generate enough electricity to power up to 140,000 homes. The plant cost \$2.2 billion to build, but the concentrated reflected sun's rays have become a laser that roasts everything and anything in its way, including insects and birds flying through the area. According to reports, the singed or incinerated birds are dying at the rate of one every two minutes.

The Ivanpah solar plant's initial problem was with desert tortoises that required the owner to spend \$34 million on a 'Head Start' nursery

These birds are called "streamers" because they ignite in mid-air creating a plume of smoke. The belief is that the bright light of the solar plant attracts flying insects that are then targeted by the birds who quickly become "streamers." The Center for Biological Diversity estimates that the Ivanpah solar plant will kill 28,000 birds a year.

We already know that power from renewables is expensive, and when all costs and benefits are considered, is not competitive with fossil fuel generated power. Now, not only does wind have a problem by killing bats and birds, including protected species, but these new concentrated solar power plants are also bird-killers. The Ivanpah solar plant's initial problem was with desert tortoises that required the owner to spend \$34 million on a 'Head Start' nursery. It is interesting, however, that environmentalists seem to be less concerned with the bats and birds killed by wind turbines, and now the "streamers" dying at solar plants, than they were with the handful of birds that landed in tailing ponds in Canada's oil sands region and died as a result of the poisonous water.

This area is reportedly richer in avian life than that around the Ivanpah plant, and is known to have protected golden eagles and peregrine falcons and more than 100 other species of birds recorded there

The new plant BrightSource Energy is proposing to build will have boiler towers standing 750 feet tall amidst a sea of mirrors. The plant is planned for a location on the flight path for birds between the Colorado River and California's largest lake, the Salton Sea. This area is reportedly richer in avian life than that around the Ivanpah plant, and is known to have protected golden eagles and peregrine falcons and more than 100 other species of birds recorded there. BrightSource is offering \$1.8 million in compensation for the anticipated bird deaths, although no one knows exactly how many are being killed. The company has suggested that the donation be used to spay and neuter domestic cats who are reportedly responsible for killing 1.4 billion birds a year, but that doesn't help the birds around the solar plants.

Dead birds are just a minor con, which is an interesting irony for environmentalists

The government would like to delay the new plant until it has conducted a full-year count of dead birds at the Ivanpah plant. Obviously, BrightSource is hopeful of avoiding a serious delay. As Thomas Conroy, a renewable-energy expert said in an interview, what the world needs is "diversity of technology." He said that we don't want to be totally dependent on any one technology – coal, gas, solar, wind or nuclear. "And every one of those technologies has a long list of pros and cons," he said. Dead birds are just a minor con, which is an interesting irony for environmentalists.

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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