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MUSINGS FROM THE OIL PATCH

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Note: *Musings from the Oil Patch* reflects an eclectic collection of stories and analyses dealing with issues and developments within the energy industry that I feel have potentially significant implications for executives operating oilfield service companies. The newsletter currently anticipates a semi-monthly publishing schedule, but periodically the event and news flow may dictate a more frequent schedule. As always, I welcome your comments and observations. Allen Brooks

BP Oil Spill Pushes Industry Beyond Tipping Point

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In trying to find an analogous situation the public can relate to, the media seems to have revisited every major environmental and technological disaster in the nation's history

The ongoing saga of trying to shut-in BP plc's (BP-NYSE) Macondo well that blew out and destroyed Transocean's (RIG-NYSE) Deepwater Horizon semi-submersible drilling rig killing 11 workers and producing an almost totally uncontrollable oil spill has pushed the domestic oil industry beyond a tipping point in its fortunes. The tipping point has been marked by populist outrage that extends across the country and around the world, even among long-time supporters of the offshore oil and gas industry. The tipping point means that the oil and gas industry will never again operate as it did before the BP well accident. Just how the industry will change is unclear, but some educated guesses can be made. One is that dirty and unsafe fossil fuels are on the defensive here in the U.S. and the prime beneficiary of that trend will be alternative fuels whether they make economic sense or not.

As each attempt to shut-in the BP well fails, frustration and doubts about the industry's vaunted technological capabilities for drilling and producing wells in ultra-deep water grow. In trying to find an analogous situation the public can relate to, the media seems to have revisited every major environmental and technological disaster in the nation's history. Many observers liken the oil well situation to the Apollo 204 capsule fire that claimed the lives of three astronauts atop the rocket at Cape Canaveral in Florida in January 1967. Others say it is more like Apollo 13 that suffered an explosion on its way to the moon and forced the three astronauts to improvise a solution to enable them to return to the Earth safely. Still others say it may be more like the space shuttle Challenger that blew up soon after launch in 1986 and cost the lives of seven astronauts including the first teacher to go into space.

Still others believe the best analogy may be President Jimmy Carter's Iranian hostage situation in 1979

Political pundits have wrestled with the implications of the oil spill for the mid-term election fortunes of the Obama presidency. Some characterize the Deepwater Horizon accident as Obama's Hurricane Katrina that destroyed New Orleans, while others consider it his Three Mile Island, the nuclear power plant accident in Pennsylvania. Still others believe the best analogy may be President Jimmy Carter's Iranian hostage situation in 1979. There is no doubt that events of BP's oil spill has similarities to each of these events, but there are also significant differences. In the case of Katrina, at some point days after the hurricane came ashore, the winds stopped blowing and the flood waters retreated. Yes, there was significant destruction in and around New Orleans and numerous deaths, but the political issue revolved around the Bush administration's response to the emergency. This event is all about execution, too.

In the case of the Three Mile Island nuclear plant accident, after the release of the nuclear cloud and the flooding of the reactor, we were left with significant technical challenges and a massive clean-up effort that had never been undertaken before and with which we had little experience. No one knew the potential long run effects from the nuclear release and clean-up effort, but visually we were left with a huge cement structure.

President Carter's administration was doomed by the public perception of weakness and ineptitude

Many people think the Iranian hostage situation is the best comparison. On November 4, 1979, a crowd of Iranian students stormed the U.S. embassy in Tehran and seized 52 Americans and held them hostage for 444 days while the Carter administration tried diplomatic efforts to get them released. When diplomacy failed, it turned to a military rescue mission that failed in the Iranian desert when two American helicopters collided killing some of the rescuers and allowing the Iranians to capture the rest. From that point forward, President Carter's administration was doomed by the public perception of weakness and ineptitude.

We tend to view President Obama and his staff as family members outside a hospital operating room following a severe auto accident

While one can find many similarities in these three events to the way the Obama administration has handled the BP spill disaster, we tend to view President Obama and his staff as family members outside a hospital operating room following a severe auto accident. While the surgeons work their magic on the victim with techniques beyond the understanding of ordinary people to fully comprehend the knowledge and skills being applied, the family members remain powerless to influence the outcome. Rather, they stand around praying or crying as emotions overwhelm them. Soon they become angry and demand immediate justice or retribution against those responsible for the accident. At the same time, the police fulfill the role of independent arbiters - determining what happened and who may be at fault – conclusions that are often different than the view of the emotionally-charged family members. The police conclusions will ultimately drive the outcome from the accident, although they may never alter the emotional scars of the family members. In the case of the BP oil spill, the newly-appointed Obama commission to investigate the cause of the accident and recommend actions to prevent another from ever happening again will fulfill the police role.

All the sins of fossil fuels and bad public relations for the oil industry have come together in this environmental disaster

At the present time, BP has become the face of the entire petroleum industry – for good or bad. All the sins of fossil fuels and bad public relations for the oil industry have come together in this environmental disaster. The failed attempts to stop the oil spill have added to the bad publicity. And it has been reinforced by the misstatements by BP's CEO, Tony Hayward. In addition, the oil spill has permanently altered the view of risk assessment among managements and boards of directors. Who would have thought that one well could potentially cost the owners \$40 billion? The risk of the unimaginable now needs to be assessed. This industry will never again operate in the same manner as it did before the Deepwater Horizon accident.

The six month moratorium on deepwater drilling is only the first step in altering how the industry will operate. When the BP oil spill commission reports at the end of November, the issue of what further operational changes it mandates and how those changes will be implemented could extend the moratorium. There are reports that some industry experts believe the moratorium could last up to 18 months before operating changes are fully resolved. In an investor call last week, Halliburton's Tim Probert said the company's working assumption is that the moratorium will end after six months and some activity should resume in a matter of weeks. But it believes it will take 12-24 months before industry activity is restored to 50% of its pre-moratorium level. Is this realistic? We believe so.

How may the offshore industry be changed in the future? Will we stop drilling in deepwater in the Gulf of Mexico? No. The undiscovered oil resources in deepwater are too important to the nation's energy supply balance.

Licensing and permitting requirements will be more onerous requiring longer application and review periods

Will the pace of offshore drilling be slower? Yes. Licensing and permitting requirements will be more onerous requiring longer application and review periods. More information will be demanded about the potential reservoir to be drilled. That may necessitate much greater seismic and reservoir analysis work upfront than done now. There will be more safety analysis and accident preparedness action plans mandated, also. For example, relief wells may need to be drilled simultaneously with the exploratory well. Or maybe one will only need a rig to be available for drilling a relief well. Maybe standby supply vessels will be mandated to assist in the event of an accident such as followed after the Piper Alpha platform accident in the North Sea in 1988 that claimed the lives of 167 men.

Whatever actions are mandated, several things will become evident. The cost to operate offshore in deepwater in the Gulf of Mexico will go up, and, we would venture to guess, not by a small amount. These higher costs will make more wells/fields uneconomic to drill and develop. That in turn will reduce the volume of new oil and gas supplies currently counted on to offset accelerating production decline rates and to increase the flow of offshore oil and gas in the nation's energy supply picture. Reducing U.S. supply will increase the power of OPEC as it will become the only incremental supply

Higher oil prices will provide an umbrella allowing higher-cost alternative energy supplies to establish stronger market positions

source able to meet rising global oil consumption. This supply constriction will be amplified should the federal government eliminate the various tax subsidies currently available to oil and gas companies. The result will be upward pressure on oil prices, but that in turn will cut into demand growth.

The elimination of oil and gas industry tax incentives is being pushed as a way to subsidize clean energy alternatives at less cost to the government. The resulting higher oil prices due to reduced industry profitability and less drilling will provide an umbrella over energy markets allowing higher-cost alternative energy supplies to establish stronger market positions.

Could new standards for deepwater drilling in the Gulf of Mexico spread globally? We think it is likely. Why? It will be because the industry does not like having different standards for equipment and procedures. Moreover, governments around the world, currently breathing a sigh of relief over the BP spill, do not want to have one so they will watch regulatory developments in the U.S. closely. Consider the evolution of single-hull oil tankers to double-hull ones. The Exxon Valdez spill in Prince William Sound in Alaska led to banning single-hull tankers from U.S. waters. Some years later after the Ericka sank off the coast of France, the entire western world outlawed single-hull tankers establishing a global standard for oil shipping and a timeline for the transition.

The BP of the future, however, will not be the BP we knew before the spill

Will BP disappear as a company as has been speculated by Wall Street? No. The BP of the future, however, will not be the BP we knew before the spill. In some cases people will say that will be a huge improvement given the company's string of environmental disasters – Alaska pipeline leak, Texas City refinery explosion, Deepwater Horizon accident and oil spill. BP's regulatory problems are further compounded by its conviction for fixing prices in the U.S. propane market. These events, combined with other infractions, have put BP on probation with the federal government. The company and the EPA were reportedly in negotiations over possible sanctions, but those discussions have stopped pending the outcome of the investigation of the cause of the Deepwater Horizon accident and resulting oil spill. It is possible BP could be banned from doing business with the federal government, which would cost the company its fuel contracts with the defense department, the loss of its federal oil and gas leases, and other commercial opportunities.

Robert Reich has suggested that the federal government should put BP's U.S. operations into receivership and run the business

Robert Reich, former Secretary of Labor in the Clinton administration, has suggested that the federal government should put BP's U.S. operations into receivership and run the business until the spill clean-up and all penalties and claims from the accident are resolved. While Wall Street analysts have rushed forward to argue that the U.S. is not Venezuela, the recent history of the Obama administration riding roughshod over the rights of bond holders in the auto company bankruptcies and its seizure of AIG all suggest that this idea cannot be dismissed out of hand. One does wonder whether the Putin-Yukos standoff might be the correct analogy for

One major change offshore will be a dramatic increase in operator liability limits for environmental damages, which could dramatically reshape the domestic oil and gas industry

predicting what might happen to BP's U.S. operations. The accident and oil spill provide the U.S. government an excuse for acting as opposed to needing to invent problems such as the Putin government had to do in order to force Shell out of its Sakhalin leases or the forced sale of Yukos' assets to Russian state-owned companies at bargain prices. As we said earlier, the unimaginable no longer can be dismissed routinely.

One major change offshore will be a dramatic increase in operator liability limits for environmental damages, which could dramatically reshape the domestic oil and gas industry. While the Obama moratorium recognizes a difference in drilling in water depths of less than 500-feet, environmentalists question how the government and regulators can arbitrarily say drilling in shallow-water is safer than in deepwater. In recent years, the shelf (under 500-feet of water) has been the hunting ground for independent oil companies. But by most definitions, these are the explorers who do not have the financial wherewithal to handle a huge environmental clean-up. While the water depths are shallower, the drilling horizons are trending deeper with hotter temperatures and greater pressures challenging the industry's technological capabilities. The blowout of a deep well could be equally as challenging to the industry as the BP oil spill has proven. The one possible offset is that much of the shelf deep drilling is for natural gas, which could be allowed to vent with probably less environmental damage.

Could the joint venture between Shell and Frontline for drilling rigs prove to be the new business model?

An interesting question is how the offshore business model might change? In recent years we saw a push by the big four oilfield service companies to become one-stop providers for their customers. The rationale has been that integrated operations conducted by a single service company improves efficiency and lowers costs. This model has been used extensively with the less technically-sophisticated national oil companies. Could this model become flawed as the major deepwater oil companies decide that they need to be in total control of the drilling process? Could the joint venture between Shell (RDS.B-NYSE) and Frontline (FRO-NYSE) for drilling rigs prove to be the new business model? History provides an interesting perspective in this regard. In the early days of the oil and gas industry, producing companies owned their own rigs and conducted drilling operations. That made sense when the companies were limited geographically. As oil companies spread out geographically, the inefficiencies of owning and operating their own rigs convinced them to sell their equipment and hire drilling contractors wherever they wanted to drill. (The advent of the gas shale play has convinced some producers to re-establish drilling rig subsidiaries, but again the logic is based on limited geographic activity and high equipment utilization.)

In the history of the offshore oilfield service industry there were various combined oil and gas producers/drilling contractors. Ocean Drilling and Exploration Company (ODECO) and Reading & Bates were examples of this business model – but neither exists anymore. SEDCO, the Texas offshore contract driller, pioneered the oil company-driller partnership business model when the cost to build

International markets will be more active and attractive for energy and oilfield service companies than the U.S. market

new semi-submersible drilling rigs escalated in the early 1980s to a point at which the financial risk to the drilling contractor was considered too great. These partnerships ultimately fell victim to the collapse in global crude oil prices in the mid 1980s as the petroleum industry entered its depression era.

At this point we have reached the following conclusions about the future shape and direction for the oil and gas and oilfield service industries: onshore oil and gas resources will become more valuable than offshore ones; shallow-water petroleum resources may be worth more than deepwater ones; international markets will be more active and attractive for energy and oilfield service companies than the U.S. market; the domestic oil and gas industry will be less profitable in the future; new U.S. offshore drilling and operating procedures will become more onerous and expensive and likely require different, more capable equipment such as standby vessels, large and more powerful blowout preventers with redundant systems; equipping all offshore service vessels with firefighting capability, for example.

NOAA Hurricane Forecast: A Job Security Call!

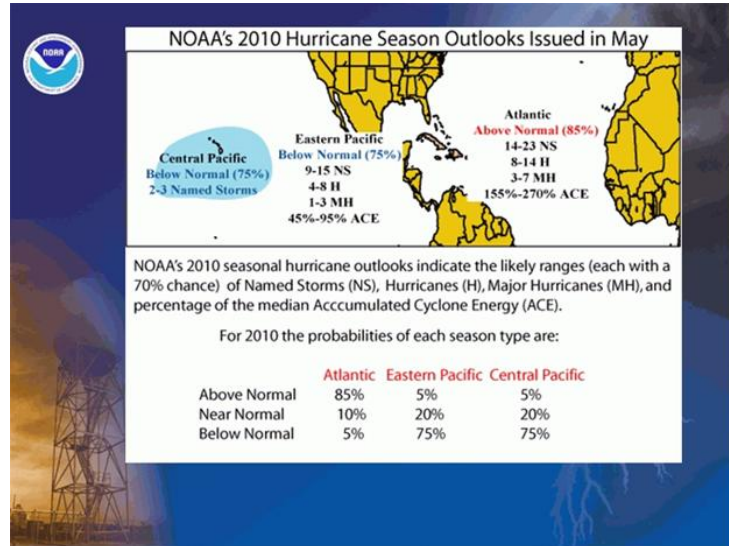
NOAA's forecast calls for 14-23 named storms this season, with 8-14 of them becoming hurricanes and 3-7 as major hurricanes

On May 27th, the National Oceanic and Atmospheric Administration (NOAA) issued its storm forecast for the 2010 hurricane season that started June 1st. The NOAA forecast was about the last of the various notable storm-forecasting groups to weigh in on this season's outlook. The Colorado State University hurricane forecasting team produced its latest forecast last week, updating their April projection, as is their normal routine. As we anticipated, NOAA sees the upcoming storm season as having an 85% probability of being an above-normal season. They say there is a 10% chance it will be a near-normal season, but only a 5% chance of a below-normal season. NOAA's forecast calls for 14-23 named storms this season, with 8-14 of them becoming hurricanes and 3-7 as major hurricanes.

All of these climate models are saying that the likelihood is high this year will be an extremely active storm season

In preparing its forecast, NOAA, like all the others, examines the large scale factors and conditions known to be strong indicators of seasonal Atlantic basin hurricane activity. It also factored in the results of a number of new climate models that are now beginning to directly predict seasonal hurricane activity. Those models include NOAA's Climate Forecast System, the European Centre for Medium Range Weather Forecasting model, the United Kingdom Meteorology office model and the European Seasonal to Inter-annual Prediction ensemble. All of these climate models are saying that the likelihood is high this year will be an extremely active storm season.

Exhibit 1. NOAA Hurricane Forecast Scariest Of All So Far



Source: NOAA

El Niño tends to depress hurricane activity in the Atlantic basin while La Niña enhances it

In looking at the large scale factors and conditions, NOAA focused on the tropical multi-decadal signal, which has contributed to the high-activity storm era in the Atlantic basin since 1995. They also considered the reduced vertical wind shear and weaker easterly trade wind patterns developing. Other factors considered were the exceptionally warm sub-surface water temperatures in March and April. Both months were at record levels. Lastly, there was the consideration of the impact of ENSO (El Niño-Southern Oscillation) on the formation conditions for tropical storms. The Pacific Ocean has the weather phenomena of El Niño and La Niña. El Niño tends to depress hurricane activity in the Atlantic basin while La Niña enhances it. These two weather phenomena make up ENSO. The three stages of ENSO are El Niño, La Niña and Neutral, and his year NOAA sees La Niña developing.

Weather patterns that are unpredictable on seasonal timescales can develop sometimes and last for weeks, and possibly months, and alter storm activity

The NOAA forecast acknowledges that there are a number of sources of uncertainty associated with its storm prediction. These uncertainties include: the ongoing scientific challenge of predicting ENSO; the recognition that there can be many combinations of named storms and hurricanes from the same set of climate conditions; that model predictions of sub-surface water temperatures, vertical wind shear, moisture, and stability have limited skill this far in advance of the peak storm months (August through October); and weather patterns that are unpredictable on seasonal timescales can develop sometimes and last for weeks, and possibly months, and alter storm activity.

In the case of sub-surface water temperatures, NOAA cited the fact that in 1958 and 1969 when sub-surface water temperatures were at record levels during the February through April period, they then fell off by 50% during the summer months helping to limit storm formation. But at the end of the day, NOAA based its forecast

The recent high-activity period (1995-2009) has seen an average of 14.5 named storms, eight hurricanes and four major hurricanes

largely on the basis that the Atlantic basin is in the midst of a high-activity multi-decadal signal. As NOAA pointed out, during the low-activity period of 1971-1994, the storm season averaged 8.5 named storms, five hurricanes and 1.5 major hurricanes. The measure of storm activity (ACE) averaged 75% of the long-term median value. During this period, half of the seasons were below-normal with only three above-normal (1980, 1988 and 1989). In contrast, the recent high-activity period (1995-2009) has seen an average of 14.5 named storms, eight hurricanes and four major hurricanes with an ACE of 160% of the long-term median value. During that period, 10 of 15 seasons were above-normal with seven meeting the definition of hyperactive, which requires an ACE value >175% of the long-term median. Only five seasons were below-normal with four of them being El Niño years (1997, 2002, 2006 and 2009).

Exhibit 2. NOAA Forecast Trumps All Other Storm Predictions

Organization	Named Storms	Hurricanes	Major Hurricanes
NOAA	14-23	8-14	3-7
Colorado State University (April)	15	8	4
Colorado State University (June)	18	10	5
Commodity Weather Group LLC	14	8	3
Tropical Storm Risk, Inc. (UK)	16.3	8.5	4
AccuWeather.com	16-18	5	2-3
1950 - 2009 Average	10	6	3

Source: Various news sources and web sites; PPHB

The CSU June forecast calls for 18 named storms, 10 hurricanes and five major hurricanes

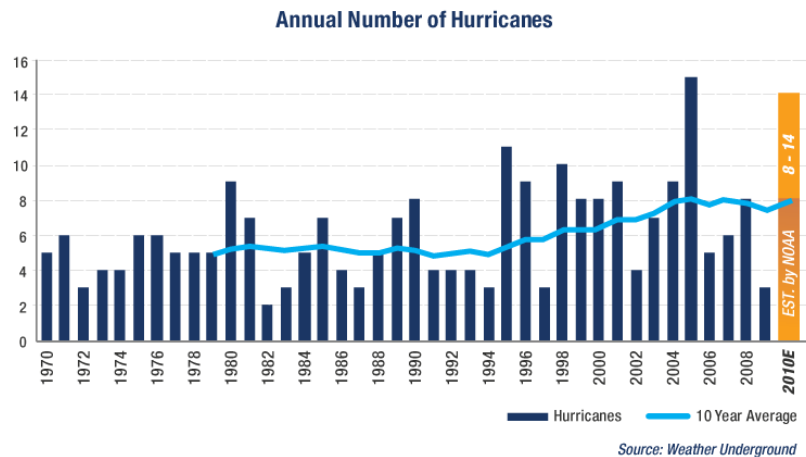
On June 1st, the Colorado State University hurricane forecasting team updated their predictions for this year. As we have noted in the past, based on their study of the forecasting model they utilize in their June forecast, it has the best success of all the various forecasting models and techniques the team employs each year. The June forecast calls for 18 named storms, 10 hurricanes and five major hurricanes. This latest projection added three more named storms, two additional hurricanes and one more major hurricane to the team's April forecast numbers. The rationale for the upgraded estimates is the continued warming of sea surface temperatures in the Atlantic basin and the transition of El Niño into a neutral role.

The Colorado State University team is calling for a 76% probability of a hurricane hitting the U.S. coastline versus a 52% probability average over the past century. For the East Coast including the peninsula of Florida, the probability is 51%, which is the same for a hurricane landing on the Gulf Coast.

It seems as if the forecasters know that the risk to their forecast is to the upside, thus to protect their jobs they decided to widen the top end of their forecast range

We found it interesting that the NOAA forecast has ranges so wide that they cover almost any possible storm scenario except for an abnormally below-normal season. It seems as if the forecasters know that the risk to their forecast is to the upside, thus to protect their jobs they decided to widen the top end of their forecast range so that if 2010 turns out to be another year like 2005 when there were 28 named storms, 15 hurricanes and 7 major hurricanes, they will be covered. The ACE rating in 2005 was 260% compared to NOAA's ACE forecast of 160% for this season. In the above table we show those hurricane forecasts we have reported on so far this year. At the bottom of the table we also show the average of the number of storms by category for 1950-2009.

Exhibit 3. History Shows Quiet and Active Hurricane Periods



Source: Weather Underground; Rigzone

As one weatherman commented after looking at the NOAA forecast, he had never seen this many storms predicted so early in any storm season

As one weatherman commented after looking at the NOAA forecast, he had never seen this many storms predicted so early in any storm season. He said that if a year turns out to be more active than initially assumed, forecasters often will go back and make adjustments to their earlier predictions. After reviewing the NOAA projection, he was not sure whether to be fearful or amused. We suspect the NOAA projections may be a job preservation forecast – it's bad to be wrong on the low side of forecasts in the current Obama administration. If you're too pessimistic that is acceptable because almost everyone forgets those projections. It only becomes an issue after you do it several years in a row so that people begin to discount the veracity of your forecasts. We anticipate 2010 to be a more active tropical storm season than last year. As we all know, the critical determinant is whether you live in an area directly targeted by a hurricane.

Electric Cars May Not Be Vehicle of Choice – Does It Matter?

By the end of this year, the U.S. will be firmly established in the next era for automobiles – the all-electric car – whether Americans are ready for them or not. The electric vehicle (EV) has been broadly

German car parts manufacturer Robert Bosch says that in regions of the U.S. where electricity is generated by coal, EVs will generate more CO₂ than their conventional counterparts

embraced by the Obama administration as a key component of its green energy and environment future for the nation. The belief that EVs emit no tailpipe pollution makes them desirable from a carbon emissions viewpoint, even if, as German car parts manufacturer Robert Bosch says that in regions of the U.S. where electricity is generated by coal, EVs will generate more CO₂ than their conventional counterparts. But that's a detail that our current government will not let get in the way of its efforts to drive (pardon the pun) the American automobile industry into this new era.

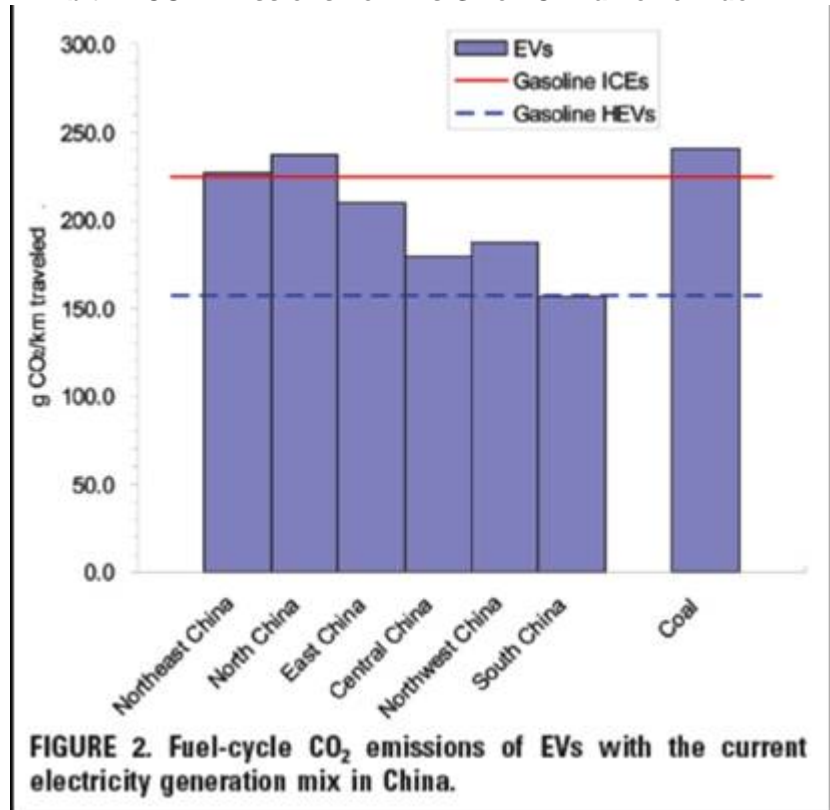
At a recent automotive conference in Germany in early May dealing with the topic of "The New Automobile" there was numerous talks by industry speakers questioning the pollution contribution of EVs. Two industry speakers, Robert Bosch technology chief Bernd Bohr and Daimler (DAI-NYSE) development chief Thomas Weber, made the point that the industry should proceed with multiple approaches to developing environmentally-friendly cars and stay open to new technologies rather than blindly accepting EVs as the best solution. They emphasized that the car industry should not underestimate improvements in the efficiency of the internal combustion engine complemented by hybrid technology. But possibly the most interesting talk against EVs came from Wolfgang Lohbeck, transportation expert at Greenpeace Germany, who emphasized the same point that Robert Bosch made about the use of fossil fuel power sources for generating electricity to run EVs and the pollution they create.

The research concluded that in China, EVs will be 50% dirtier than HEVs, could double NO_x emissions while increasing SO₂ emissions by 3-10 times

The American Chemical Society recently published a white paper in *Environmental Science & Technology* prepared by a team of researchers at Tsinghua University in Beijing and Argonne National Laboratory Center for Transportation Research entitled "Environmental Implications of Electric Vehicles in China." The paper reached two conclusions: 1) that embracing EVs in China, given its fueling sources for power generation, will increase national CO₂, SO₂ and NO_x emissions; and 2) that Hybrid EVs are more environmentally friendly, more commercially mature and less cost-intensive than EVs. The research concluded that in China, EVs will be 50% dirtier than HEVs and could double NO_x emissions while increasing SO₂ emissions by 3-10 times. The chart below shows the CO₂ emissions by region of China based on its fueling of power plants for EVs, gasoline engines and Hybrid EVs. As the chart shows, in two regions EVs are equal to or more polluting than gasoline engines, while only in South China are EVs as clean as Hybrid EVs.

By using government subsidies to lower the initial purchase price for EVs the U.S. government believes it can jump-start this business. Actual cash losses on EVs, or their marginal profits, will be offset by the greater profitability of larger SUVs, sedans and light trucks, a game Detroit played for many years before sinking into bankruptcy. But the brass ring of EVs will be sought by almost every auto manufacturer as the government creates an uneven playing field that can only be mastered by getting into the game.

Exhibit 4. CO₂ Emissions For EVs Given China Power Fuel



Source: American Chemical Society

The survey showed that drivers are averaging about 100 miles on a single charge, about one-third fewer miles than BMW expected

A big problem, however, seems to be that EVs aren't meeting their initial hype. For the past year, BMW AG (BMW-NASDAQGS) has leased 300 of its Mini Cooper cars to real customers in the New York City area, New Jersey and Southern California. BMW conducted a survey and allowed *The Wall Street Journal* to see the results and interview customers. The survey showed that drivers are averaging about 100 miles on a single charge, about one-third fewer miles than BMW expected. The Mini Cooper is advertised as getting 156 miles on a single charge, based on a driving test conducted by the U.S. Environmental Protection Administration (EPA). Now that the car has been subjected to real world driving, the EPA test appears to be grossly overstating the mileage customers can expect to get from EVs. According to the survey, customers seem to be getting enough range to meet almost all their driving needs, and that appears to be the most important conclusion for BMW. The EPA is working on revising its methodology for determining the performance of EVs in anticipation of many new models that need to be tested and the inherent fear customers have of running out of charge before running out of distance.

Later this year, Nissan (NSANY.PK) will be introducing its Leaf, all-electric car that has already sold out its pre-manufacturing orders. In fact, several of the Mini Cooper lessees have put down the \$99

The Leaf will have a 24-kilowatt battery pack compared to BMW's 35-kilowatt pack

deposit for Leafs, but based on their driving range experience are beginning to worry about their decision. The Leaf is advertised by Nissan as getting 100 miles per charge. Despite the Mini Cooper experience, Nissan continues to hold to its range claim. That may be questionable given that the Leaf will have a smaller battery pack than the Mini Cooper. The Leaf will have a 24-kilowatt battery pack compared to BMW's 35-kilowatt pack. According to Nissan, the range achieved will depend upon how the car is driven and the use of the heater and air conditioner.

BMW emphasized that most of its customers still achieved about 100 miles on a charge with some better and others less

Mark Perry, Nissan's lead product planning official for North America, says, "The most impact on range really is how hot and cold you have set your interior cabin." This statement sounds like a commercial for a spring and fall car rather than a summer or winter one. There were no concerns expressed about the temperature of the Mini Cooper cabin, but there were observations about the difference between city and highway driving. The BMW survey showed that the Mini Cooper performed well in stop-and-go traffic, but when the car was on the highway at 70 miles per hour consistently, its distance dropped into the 60-70 mile range. BMW emphasized that most of its customers still achieved about 100 miles on a charge with some better and others less.

In the case of Nissan, its CEO Carlos Ghosn is counting not only on the subsidy, but also for the subsidy to be extended in order to justify his plan to eventually sell 350,000 EVs a year

The GM Volt electric vehicle is designed to get 40 miles on a charge, but since it has a small gasoline engine that can run the car once the battery charge is exhausted, it expects buyers not to have the same range-fear. But with all these electric vehicles, manufacturers are counting on the government's \$7,500 per vehicle subsidy to help sell them. In the case of Nissan, its CEO Carlos Ghosn is counting not only on the subsidy, but also for the subsidy to be extended in order to justify his plan to eventually sell 350,000 EVs a year. Nissan has been helped already by the Obama administration's \$1.4 billion grant for revamping an old auto plant in Tennessee to manufacture the Leaf.

If politicians had the courage to raise gasoline pump prices there would be strong price signals given to consumers that would prompt them to become more efficient in their fuel use

At the end of the day, the question remains wouldn't it be better if the federal government wasn't in the business of picking winners and losers in the auto fuels business? If politicians had the courage to raise gasoline pump prices there would be strong price signals given to consumers that would prompt them to become more efficient in their fuel use. One can double the fuel-efficiency of a car by having two passengers rather than one. You can drive fuel-efficiency to infinity if you cut out unnecessary trips. Unfortunately, allowing the market to send price signals to drive consumption behavior is not an acceptable method of regulating either the economy or energy.

Arctic Book Puts Growing Region's Importance In Focus

One aspect of President Obama's offshore drilling moratorium is the suspension of drilling permits for two wells Shell (RDS.A-NYSE) was planning to drill this summer off Alaska's coast in the Chukchi Sea.

The USGS calls the offshore Arctic the biggest unexplored area for potential petroleum reserves left on Earth

Earlier in the spring, when President Obama announced his plan to suspend the offshore drilling moratorium off Florida in the Gulf of Mexico and along the lower portion of the East Coast, he suspended a lease sale scheduled for the Beaufort Sea in the Arctic region of Alaska. These decisions reflect a view that the environmental risk of drilling these wells in the pristine waters off Alaska is too great to allow them to go forward.

The U.S. Geological Survey (USGS) calls the offshore Arctic the biggest unexplored area for potential petroleum reserves left on Earth. As global warming trends have begun to open the waters of the Arctic Ocean on a year-round basis, neighboring governments have engaged in efforts to establish their claims to land in this virgin region.

Exhibit 5. Arctic Region Virgin And Important



Source: Personal Finance

Under international law, no country currently owns the North Pole or the region of the Arctic Ocean that surrounds it

The Arctic Circle, which is a line encircling the globe at 66°33'39"North, encompasses an 8.2 million square mile area, or about 6% of the Earth's surface. Under international law, no country currently owns the North Pole or the region of the Arctic Ocean that surrounds it. The five surrounding Arctic countries – Russia, the United States, Canada, Norway and Denmark (Greenland) are entitled to claim a portion of this area. Nations with coastlines are limited to an exclusive economic zone extending 200 nautical miles (230 miles) adjacent to their coast. Since the exclusivity area extends from the known coastal shelf or land under territorial waters out to 12 nautical miles, determining exactly where their respective shelves end will prove important in determining the 200-mile zones, and in turn, the amount of natural resources each country may ultimately claim. The total coastal area within the Arctic region is estimated to encompass an estimated 2.7 million square miles under less than 500 meters (1,640 feet) of water.

On the 3.1 million acres of onshore acreage within the Arctic Circle that have been explored, roughly 400 oil and gas fields in Canada,

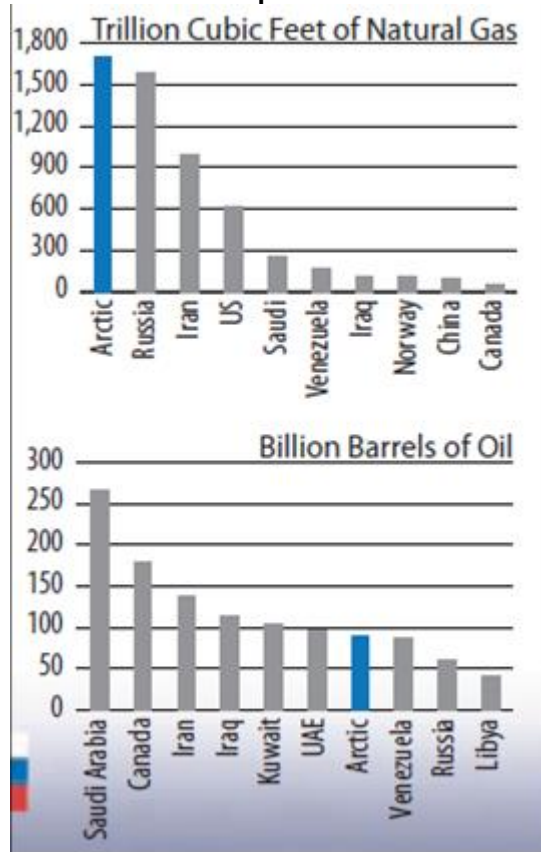
The USGS estimates that in the Arctic is about 30% of the world's undiscovered gas and 13% of the world's undiscovered oil

Russia has the longest Arctic coastline of any of the Arctic states, representing about 30%-35% of the total in the region

Russia and Alaska have been discovered. These fields account for approximately 240 billion barrels of oil and oil-equivalent natural gas, or about 10% of the world's known conventional petroleum resources. The USGS estimates that the total mean undiscovered conventional resources in the Arctic are approximately 1,669 trillion cubic feet of natural gas, 90 billion barrels of oil and 44 billion barrels of natural gas liquids, or about 30% of the world's undiscovered gas and 13% of the world's undiscovered oil, most of which lies offshore in less than 500 meters (1,640 feet) of water.

The amount of undiscovered natural gas is three times more than oil in the Arctic and is largely concentrated in Russia. It has the longest Arctic coastline of any of the Arctic states, representing about 30%-35% of the total in the region. Russia must still prove the validity of its territorial claims to the UN Commission on the Limits of the Continental Shelf by 2011. To enhance its claim, in April 2007 Russia sent a deep-sea submarine to the bottom of the Arctic Ocean to plant a titanium-flag beneath the North Pole. Canada has been the loudest critic of Russia's Arctic land grab and has been actively working to establish its own claim to substantial areas of this region.

Exhibit 6. Arctic Important Source of Petroleum



Source: USGS, EIA, Personal Finance

To better understand the struggle over the Arctic region and its

The book reflects the outcome of a life-long fascination with the Arctic Circle, a line Mr. Emmerson first crossed when he was 10 years old while accompanying his family on a vacation in Sweden

resources, we recently read Charles Emmerson's [The Future History of the Arctic](#) that details the past, present and possible future for the region. Mr. Emmerson was formerly the Associate Director of the World Economic Forum and before that worked with the International Crisis Group, a foreign policy think tank. The 320-page volume is noteworthy with its 63 pages of notes expounding on sources and issues explored in the book. The book reflects the outcome of a life-long fascination with the Arctic Circle, a line Mr. Emmerson first crossed when he was 10 years old while accompanying his family on a vacation in Sweden. At seven years old he had crossed the International Date Line and subsequently the equator and the tropics of Capricorn and Cancer on the way to Australia from Europe where he lived. But this time, Mr. Emmerson was asleep when the train his family was riding in from Stockholm to Kiruna, Sweden crossed the Arctic Circle, the last line of geographic note for the young boy. It was this missing event that seems to have driven his obsession to understand this virgin, yet challenging and complicated region of the world.

The book is divided into five sections: Vision that details the origins of the idea of the Arctic region; Power that outlines the historical struggles that shaped the borders of the modern Arctic; Nature that highlights the importance of the Arctic for understanding the evolving impact of climate change; Riches that focuses on the role natural resources in the Arctic have played in its developing history and where and how they are likely to be exploited in the future; and finally Freedom that discusses the choices facing the smaller Arctic nations as they seek to choose their own future as independent countries.

We learn about the laser-focus of Lenin and Stalin on developing the Arctic from strategic, geographic and economic points of view for Russia

There are a number of critical issues explored that come from the histories of the various countries bordering the Arctic region. For example, we learn about the laser-focus of Lenin and Stalin on developing the Arctic from strategic, geographic and economic points of view for Russia. The defeat by the Japanese in the 1904-5 war highlighted the importance of developing Russia's Arctic region. After the defeat of the country's Pacific fleet, Russia was compelled to send its Baltic Sea fleet half-way around the world to relieve its besieged Pacific garrison based at Port Arthur, only to have the fleet defeated due to the strain of its travels. Had Russia developed an Arctic coastal route that was not only shorter but had coaling stations, the outcome of the Russo-Japanese war might have been different, which would have altered the history of the Pacific region. Recognition of its need to develop the Arctic led to Russia's widespread use of political prisoners as a cheap and captive labor force. The prisoners were initially employed to dig the White Sea Canal that ultimately proved to be a waste of both human and capital resources. Following that failed effort Russia used prisoners to populate and develop the economic resources of Siberia and the rest of the nation's Arctic region. The prisoner effort initiated the development of gulags written about so dramatically by Aleksandr Solzhenitsyn in [The Gulag Archipelago](#).

Mr. Emmerson is a strong believer in global warming and, as such, spends time investigating the case for it and discussing its implications on the future environment of the Arctic

The book is an easy way to grasp the significant issues and their context that have shaped and are continuing to shape the politics of the Arctic

There is also a detailed history of the purchase of Alaska from Russia by the United States and known as Seward's "Folly." That transaction was transformational in that it helped drive the creation of the Canadian union as the nation's eastern provinces agreed to admit British Columbia, which then led to them including all the less-populated western prairies and the Northwest Territories. Along with the political aspects of the evolution of North America, the development of the oil and gas industry in Alaska and Canada – both the Normal Wells discovery and the Mackenzie Delta successes – are covered in the book.

Mr. Emmerson is a strong believer in global warming and, as such, spends time investigating the case for it and discussing its implications on the future environment of the Arctic. He does acknowledge, however, that the Arctic Ocean was relatively ice-free in earlier periods before CO₂ was a significant factor. In fact, Mr. Emmerson discusses the response of the United States in the 1950s to the Russian launch of its Sputnik satellite that put it ahead of the U.S. space effort. The U.S. responded by sending the USS Nautilus, the nation's first nuclear-powered submarine, on a trip traversing the entire Arctic Ocean underwater including sailing directly under the North Pole. We vividly recall this trip as the ship's crew disrupted an honor for our 1958 All-Star baseball team that had just finished fourth at the Little League World Series. Several weeks after the tournament, we were being feted by the New York Yankees at Yankee Stadium. We were scheduled to go into the Yankees' locker room and eventually into their dugout before the game and to be introduced to the crowd, but that evening the crew of the USS Nautilus arrived in New York City and were accorded those honors over a group of eager 12-year olds. We were introduced during the game.

The Future History of the Arctic is well researched and written. It is based on extensive interviews conducted by the author that provide information supporting the book's themes he explores. The book is an easy way to grasp the significant issues and their context that have shaped and are continuing to shape the politics of the Arctic – one of the last great energy frontiers remaining on the planet. While the current U.S. offshore drilling moratorium is a setback for Alaska drilling, the issue of what drilling and how it is done in the Arctic region – in the U.S., Canada, Russia, Norway, Greenland and Iceland – will become front page news in the not too distant future. We urge you to consider adding Mr. Emmerson's book to your summer reading list.

Global Warming Fears Wane In Britain Despite Government

In an amazing development, *The New York Times* (NYT) reported in a front-page story placed above the fold on recent surveys in Britain and Germany showing waning concern among citizens about global warming and its cause. According to the story, a February survey conducted by the British Broadcasting Corporation (BBC) found that

Only 26% of Britons agreed with the statement that “climate change is happening and is now established as largely manmade”

only 26% of Britons agreed with the statement that “climate change is happening and is now established as largely manmade.” That response is down from 41% who supported a similar statement in a poll taken in November 2009. Similarly, a poll conducted for *Der Spiegel*, a German magazine, found only 42% of Germans feared global warming compared to 62% who were similarly fearful four years earlier.

A survey conducted by YouGov on behalf of EDF Energy in the UK showed that public concern over global warming and climate change had fallen to 62% from 71% in 2009

The *NYT* article also highlighted that London’s Science Museum recently announced that a permanent exhibit planned to open later this year will be called the Climate Science Gallery as opposed to its prior designation as the Climate Change Gallery. In January there was a poll taken of the personal priorities of 141 Conservative Party candidates deemed capable of winning in the recent election. The poll found that “reducing Britain’s carbon footprint” was the least important of the 19 issues presented to them.

Only a couple of weeks ago, it was reported that a survey conducted by YouGov on behalf of EDF Energy in the UK showed that public concern over global warming and climate change had fallen to 62% from 71% in 2009. These results came out about the same time that reports suggested the UK will fall short of its ambitious goal of cutting the nation’s greenhouse gas emissions by 34% by 2020. To meet this goal, the newly installed government needs to introduce meaningful and effective policies promoting clean energy consumption and restricting fossil fuel use. Enacting these policies may prove difficult given the waning public attitude in the UK.

Sec. Huhne told his interviewer that “I’m very, very keen that we should develop renewable energy as a resource for this country”

In the past several days, an article reported on comments made at a press conference at the All-Energy conference by the new UK Energy Secretary Chris Huhne that showed his support for green energy, but also highlighted problems the coalition government may be having in developing its energy policy. Sec. Huhne told his interviewer that “I’m very, very keen that we should develop renewable energy as a resource for this country.” He went on to pledge his personal support for renewable energy. At the same time, however, he said he wants to make sure that the oil and gas sector knows it has the Government’s continued support. What has been deciphered from these statements and various statements made by other officials in the Conservative/Liberal Democrat Government is that there is a split on support for nuclear power.

A major factor in shifting British public opinion on global warming has been the hacking of the emails from climate change scientists at the East Anglia University

Sec. Huhne was quoted saying during his press conference that he believes this will be “the greenest Government in British history.” One wonders how that will come about given the waning support for global warming and climate change as an important social issue and the failure to cut emissions as sharply as planned. A major factor in shifting British public opinion on global warming has been the hacking of the emails from climate change scientists at the East Anglia University showing manipulation of scientific research data and attempts to bar publication of critical analyses and to discredit climate change skeptics.

This is believed to be the first time in England that a university audience of undergraduates has rejected the idea that global warming could become a global crisis

The result of Climategate, as the email hacking has been dubbed, and the shift in climate change perceptions can best be summed up by the statement from Ben Stewart, a spokesman for Greenpeace, when he said, "Legitimacy has shifted to the side of the climate skeptics, and that is a big, big problem." Just how far the shift has been was demonstrated by a debate held about three weeks ago sponsored by the Science and Public Policy Institute of Washington, D.C. The debate was conducted by members of the historic Oxford Union Society, the world's premier debating society. The motion debated stated: "That this House would put economic growth before combating climate change." Eight debaters presented the arguments for and against the motion. At the debate's end, the Honorable Members filed out of the Debating Chamber and passed on either side of the brass division-pole at the main door with the Ayes (135) going to the right and the Nays (110) to the left. This is believed to be the first time in England that a university audience of undergraduates has rejected the idea that global warming could become a global crisis.

U.S Wind And Europe Offshore Wind In Challenging Times

The week before last the American Wind Energy Association (AWEA) held its annual conference in Dallas that was well attended and generated positive media coverage. In concert with the conference, studies about wind's future in the United States were published, all with optimistic outlooks. About the same time, a wind conference was held in Europe discussing the outlook for offshore wind power and the enormous investment required to achieve the industry's and politician's goals.

The problem for U.S. wind is that installation costs and falling power demand have undercut the need for more wind power generating capacity

The problem for U.S. wind is that installation costs and falling power demand have undercut the need for more wind power generating capacity. Last year set a record for newly installed wind capacity with 9.8 gigawatts (GW). The estimates are that wind power capacity in 2010 will total somewhere between 6.3 GW and 7.1 GW. This would mark the first year since 2004 when the subsequent year didn't see more power capacity installed. According to industry forecasts, the nation is on pace to install 165 GW by 2025. According to the HIS Emerging Energy Research report, the industry will need to invest \$330 billion over the 2010-2025 period with 90% of the money directed to new onshore wind capacity. Only 5% of projected spending will be for offshore wind, despite the recent approval of Cape Wind's project offshore Massachusetts.

For the first quarter of 2010, the power industry only installed 539 megawatts (MW), or 0.5 GW of wind capacity

For the first quarter of 2010, the power industry only installed 539 megawatts (MW), or 0.5 GW of wind capacity. Unless the pace accelerates rapidly and soon, it will be impossible for the industry to meet the projected capacity additions this year. Historically, the wind industry has had to deal with an uncertain tax subsidy environment, but now the tax credit for wind power production, while still only temporary, has now been extended through 2012. In the past, each time the tax credit expired, industry investment would

With natural gas prices in the \$4 per million BTUs range, wind power has lost all the price advantage it had when natural gas trade around \$10/million BTUs in 2008

plummet only to rebound once the credit was re-enacted. This time, however, the problems wind energy is confronting are low natural gas prices and falling electricity demand. Combined they have reduced utility demand for wind power.

According to Michael O'Sullivan, senior vice president of NextEra Energy Resources, formerly Florida P & L (FPL-NYSE), "Everyone wants to buy wind. But not at the price we're offering today. We have to get our costs down." With natural gas prices in the \$4 per million British thermal units (BTUs) range, wind power has lost all the price advantage it had when natural gas trade around \$10/million BTUs in 2008. To understand the impact, one only needs to look at Texas where the wholesale power market uses natural gas prices as the benchmark to pay power producers no matter what type of power they're adding to the state's electric grid. When natural gas prices were about \$10/million BTUs, wind generators' megawatts of power were worth that price. Now at around \$4/million BTUs, wind power is probably at breakeven so generators are deferring new wind power installations.

The cost problem is potentially even greater for offshore wind in Northwest Europe. Recently, the Clingendael International Energy Programme, a prestigious energy think tank in the Netherlands, held a conference to assess the prospects for offshore wind power. The conclusion was that the industry's future depends upon two key factors: the ability of industry to reduce costs significantly and the willingness of governments to provide strong political backing.

The countries in Northwestern Europe and those surrounding the North Sea are planning to install 50,000 MW of new offshore wind power generating capacity, or the equivalent of 50 sizable nuclear power plants

Currently, the countries in Northwestern Europe and those surrounding the North Sea are planning to install 50,000 MW of new offshore wind power generating capacity, or the equivalent of 50 sizable nuclear power plants. These wind farms will produce about 190 terrawatt-hours (TWh), approximately equal to the total electricity consumption of the Netherlands and Belgium combined. It would take 17 nuclear power plants of 1,000 MW capacities to achieve the same output. One major difference, however, that is seldom mentioned in these comparisons is that a nuclear power plant will produce power for 40-50 years compared to only 15-20 years for wind turbines.

This is one-tenth of what is needed and after 10 years of work

With such a large offshore wind power undertaking planned, the fact is that as of January 2010 only about 2,000 MW of offshore wind capacity had been built. There is some 3,500 MW under construction. This is one-tenth of what is needed and after 10 years of work. The question is whether there will be sufficient government incentives to drive a faster pace of building offshore wind generating capacity if the capacity goal is to be achieved.

In the Netherlands, a high-level, government-commissioned task force called 'Wind Energy at Sea' published a report with an interesting analysis. For a fictitious 4,800 MW offshore wind park government support schemes in the UK, Germany, Belgium and the Netherlands are roughly the same presently. The subsidies vary

On a per kilowatt-hour basis, the costs are roughly three times as much as current wholesale electricity prices

from €18 billion (\$21.6 billion) in the Netherlands and Germany over a period of 15 years to some €20 billion (\$24 billion) in the UK and Belgium over 20 years. These subsidies are on top of the revenue utilities earn from selling the power. According to the task force, total production costs per megawatt-hour (MWh) vary from €173 (\$208) in Belgium to €180 (\$216) in the Netherlands and Germany and €182 (\$218) in the UK. On a per kilowatt-hour basis, the costs are roughly three times as much as current wholesale electricity prices. There still remains the investment necessary to build and expand the power grid connections in the Northwest Europe region estimated at between €5 billion (\$6 billion) and €11 billion (\$13.2 billion) in net present value terms. The task force estimates that the total investment to build the 50,000 MW of offshore power will reach €200 billion (\$240 billion) over the 20-year period.

He estimated that 40,000 MW of offshore wind power in 2020 would require €100 billion (\$120 billion) in government support

Another participant at the conference was Pieter Tavenier, Director Offshore of Eneco, the third largest Dutch utility company and owner of a 120-MW offshore wind farm. He estimated that 40,000 MW of offshore wind power in 2020 would require €100 billion (\$120 billion) in government support. He said that total offshore wind subsidies in the European Union amounted to €700 million (\$840 million) in 2010 and would trend upward to €10 billion (\$12 billion) in government support by 2020. His major point was that costs for offshore wind are too high and need to come down because governments can no longer continue to subsidize offshore wind to such an extent.

He believes the industry must lower costs to about €100 (\$120) per MWh that could be accomplished by “industrialization”

Mr. Tavenier stated that the cost to build and operate an offshore wind farm in the Dutch sector of the North Sea had increased by 30% in the last two years. Total production costs are about €170 (\$204) per MWh with wholesale power prices hovering around €50 (\$60). He believes the industry must lower costs to about €100 (\$120) per MWh that could be accomplished by “industrialization.” To achieve this will require greater standardization of wind farm developments including designing larger wind turbines (6 MW or twice the size of current turbines) and constructing trains of wind turbines over various sites that would allow the maximization of assembly lines and installation-vessel utilization. Besides larger turbines and more efficient installation-vessel use, it will also necessitate larger development zones and the allocation of these zones to companies on the basis of their ability to install the farms rather than the price they are willing to pay to secure licenses. What Mr. Tavenier is advocating is a radical change in how the offshore wind industry currently operates in order to overcome the inherently higher cost of offshore power. It sounds to us that in both Europe and the U.S. the power industry is learning that economics matter more than they thought. Without substantial government financial support coupled with mandates on power consumers to buy wind power, these generators’ business models suffer from a fundamental flaw – their product is overpriced in a commodity market.

Upcoming Reader Survey

We are planning to send out a special Musings and will ask you to return it with the number of people to whom you forward it

For the past year or so there has been a running discussion about how many people actually read the Musings. We know how many issues we send out, but based on comments and discussions with readers we know many of our direct recipients forward the Musings to others. We are happy that loyal readers find the Musings interesting and informative to the extent they want their friends and colleagues to read it. Unless we develop a better technical solution, we are planning to send out a special Musings (in the off-week) and will ask you to return it with the number of people to whom you forward it. We are going to ask those recipients of forwarded copies to also send us an email with the number of people they may forward it to. We have an idea what we think our readership is, but until we can get some solid data it remains only a guess. We thank you for your response in advance.

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