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ENERGY INVESTMENT BANKING

MUSINGS FROM THE OIL PATCH

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

Health Of Saudi Ruler Could Become Black Swan In 2013

Early last week rumors were circulating in the media and intelligence organizations that Saudi Arabia's King Abdullah bin Abdulaziz al Saud was near death

Early last week rumors were circulating in the media and intelligence organizations that Saudi Arabia's King Abdullah bin Abdulaziz al Saud was near death. The 89-year old King had back surgery on November 17 but had not been seen in public since then. On November 29, as the rumors of his condition circulated, the King was shown on Saudi Arabian state television seated and receiving well-wishers at a Riyadh hospital. The response by the Saudi stock market was swift and positive ending an extended decline in the Tadawul index that had begun before the King's surgery but accelerated afterward when the rumors of his near-death condition circulated.

Exhibit 1. Market Up On King's Return

Source: ***FT***

When King Abdullah was elevated to the throne following the death of the previous King, the stock market rallied 55% in the subsequent seven months

This is not the first time the Saudi stock market had been a barometer of investor fear about what a change in royal family leadership could mean. When King Abdullah was elevated to the throne following the death of the previous King, the stock market rallied 55% in the subsequent seven months reaching its all-time peak. The index had declined during the illness of the prior King, which can be seen in the chart of the index's trading between January 2004 and November 2006. (See Exhibit 2.) The previous King became ill during the summer of 2005 and one can see the decline in the Tadawul index from late June to mid-July at which time King Abdullah assumed the throne sending the market higher.

Exhibit 2. Saudi Market Suffers With King's Health

Source: ***tradingeconomics.com***

Most analysts expect the transition from King Abdullah to his designated successor, Crown Prince Salman bin Abdulaziz, to go smoothly

A reason the Saudi Arabian stock market is nervous about royal succession is fear about what might change with a new ruler even though he would be from the extended family that founded the kingdom and presumably he would adhere to existing policies. In most cases, very little would change in the kingdom or with regard to its governing policies or oil output, so a leadership transition represents more of a transitory period of heightened investor concern rather than real fear. This seems to be the case today as most analysts expect the transition from King Abdullah to his designated successor, Crown Prince Salman bin Abdulaziz, to go smoothly. What may be of greater significance for investors is the selection of the next Crown Prince, as he will eventually become the future leader. (We are republishing in Exhibit 3 the succession chart for the Saudi Arabia royal family generated by *Stratfor* at the end of this article.)

Following Naif's death, Salman was designated crown prince

Since the 1960s, Saudi Arabia's kings have appointed a second deputy prime minister that serves as a de facto crown prince-in-waiting. The previous two crown princes, former Defense Minister Sultan bin Abdulaziz and former Interior Minister Naif bin Abdulaziz, died in October 2011 and June 2012, respectively. Following Naif's death, Salman was designated crown prince. But who will succeed Salman when he assumes the throne?

The Sudairis have held a disproportionate amount of power since the 1970s and other parts in the family want some balance

Sultan, Naif and Salman are part of the Sudairi portion of the family. Tradition has provided that the top two family rulers will not come from the same portion of the family, therefore, the possibility that Salman might appoint Ahmed bin Abdulaziz, the next in line in the Sudairi clan is problematic, especially since he was recently replaced as interior minister by Naif's son, Mohammed bin Abdulaziz. The Sudairis have held a disproportionate amount of power since the 1970s and other parts in the family want some balance. Salman probably would not want to upset the balance of power within the royal family at this critical point in the history of Saudi Arabia.

There are very few second-generation princes alive with the qualifications to become crown prince

There are very few second-generation princes alive with the qualifications to become crown prince. Former intelligence chief Prince Muqrin bin Abdulaziz could be a candidate. He is the youngest surviving son of the founder of modern Saudi Arabia, was recently named an advisor to the King and reportedly is in good health. His problem is that his mother is Yemeni. Another possibility is Prince Sattam bin Abdulaziz, a longtime deputy governor of Riyadh province, who became governor when Salman became defense minister in October 2011. His problem is he is considered too uncharismatic and too inexperienced to be the heir apparent.

Now it appears the better choice for crown prince may come from the third-generation princes. In this group there have been several names mentioned. These include Foreign Minister Prince Saud al-Faisal, his brother Prince Turki al-Faisal, who was the kingdom's longest serving intelligence chief, and their half-brother Prince Khalid al-Faisal, the governor of Mecca. Saud is supposedly very ill. Turki's career ended with his resignation as ambassador to the UK following a disagreement with King Abdullah. Khalid traces his ancestry to the founder of Wahhabism and his tenure as governor of Mecca has endeared him to the religious establishment. He appears to be pragmatic in governing and is well respected within the kingdom. There is also Prince Mitab bin Abdullah, one of King Abdullah's sons, who heads the Saudi Arabian National Guard.

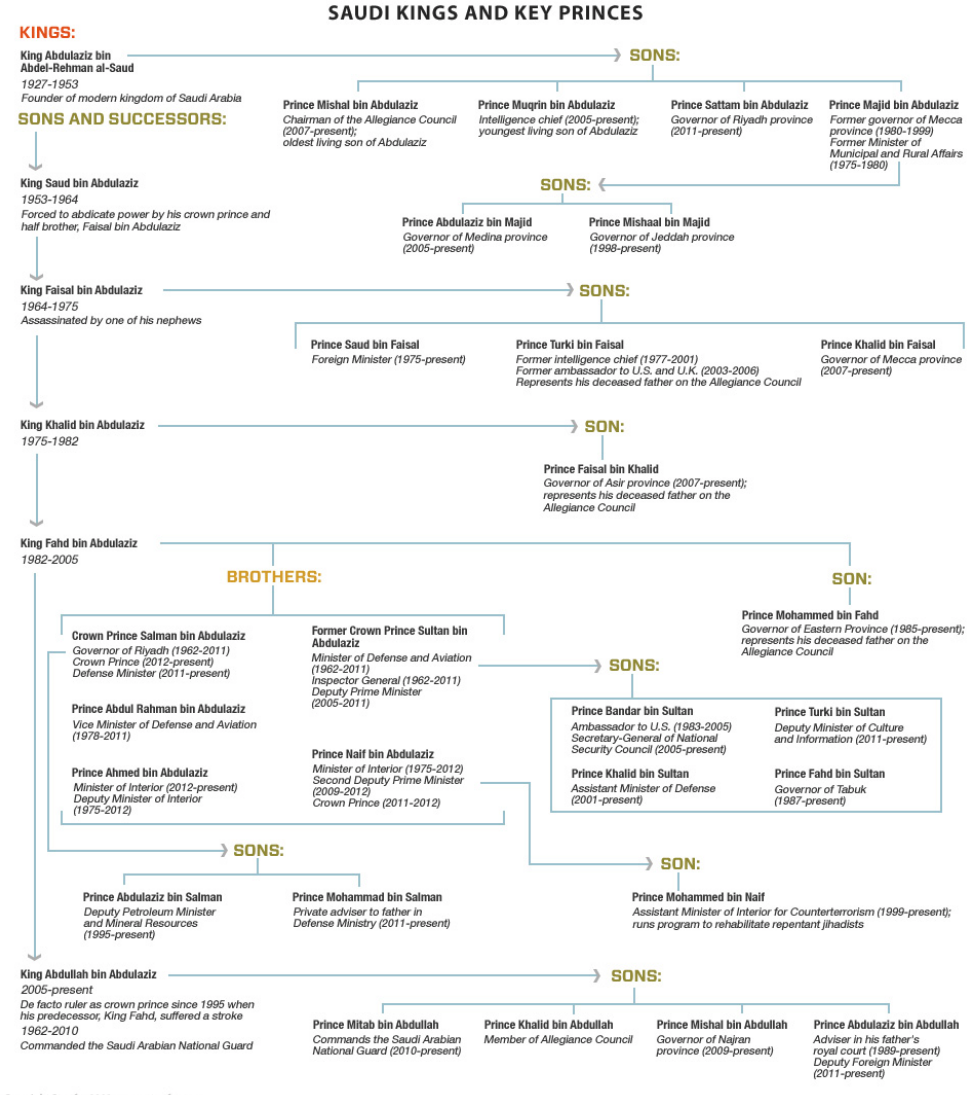
What this means is that the number of potential crown princes has grown and the old way of selecting the next king that involved the family huddling and picking that leader is probably dead

The one trend emerging among all this uncertainty about succession is that the next crown prince is likely to come from the third generation, and he will become the next king following the death of Salman. What this means is that the number of potential crown princes has grown and the old way of selecting the next king that involved the family huddling and picking that leader is probably dead. This is why King Abdullah decreed a succession law in 2006 that created the Allegiance Council, which is supposed to elect the next king and crown prince. As suggested by others, this succession process assumes the family can operate within a democratic tradition, which has never existed within the family and there is little reason to think it will exist in the future. As a result, the potential for rifts among family factions is high, creating the risk of instability in the world's biggest oil producer and exporter.

To cover the increased spending needed for buying stability, the new rulers may opt to boost oil output in order to generate additional income, even if it is at the expense of global oil prices

Added to the fear of possible instability due to the succession process is the issue of how this next generation of leaders will deal with governing. Will they desire to keep political stability through increased domestic spending, or will they be faced with political and social dissention? To cover the increased spending needed for buying stability, the new rulers may opt to boost oil output in order to generate additional income, even if it is at the expense of global oil prices. It is entirely possible the Arab Spring, which was prevented from visiting Saudi Arabia by the King's increased social spending and job-creating construction work, might arrive, further adding to the geopolitical uncertainty in the Middle East. For us, the change in Saudi Arabian leadership could become the Black Swan of 2013.

Exhibit 3. The Succession Matrix For Saudi Arabia



Source: ***Stratfor***

Abandoning Nuclear Power Creating Problems For Germany

The government's reaction to the nuclear disaster was to shut down all of Japan's nuclear reactors

In March 2011, an earthquake near Tōhoku Japan caused a tsunami that flooded the lower rooms of the Fukushima Daiichi nuclear power plant shutting down the electric pumps designed to pump cooling water to three reactors. Without that cooling water, the nuclear rods overheated and melted down as there was a several day delay before Tokyo Electric Power Company, the plant's owner, was advised to begin pumping salt water to cool the reactors. By then it was too late. The government's reaction to the nuclear disaster was to shut down all of Japan's nuclear reactors and shift to generating all of the country's power from oil and gas. The fear of the nuclear accident led many governments around the world who had previously embraced nuclear power to reassess that commitment.

The government pledged to boost its share of total power generated from renewables to at least 35% by 2020

In Europe, German Chancellor Angela Merkel became a champion of Energiewende, a program promoting switching the country off nuclear power and replacing it with energy produced from renewables. The philosophy behind the plan has a long history that began with Germany's reaction to the Chernobyl nuclear plant disaster in 1986. The opposition has never ebbed and in 2000 the red-green government of Social Democrats and Greens put a long-term phasing out of atomic power into law. Initially, the government of Chancellor Merkel moved to prolong the lifespan of Germany's nuclear reactors but then reversed itself following the Fukushima accident. Some observers, however, believed Ms. Merkel's reversal was partially explained by her party's belief that it would need the support of the Greens to be able to govern. Under the new policy, Germany moved to shut down eight of the country's 19 nuclear plants immediately, while pledging to shut down the rest by 2022. The government pledged to boost its share of total power generated from renewables to at least 35% by 2020. Even with these actions, Germans still harbor a fear that a nuclear plant accident anywhere between the Baltic and Black Seas could have serious consequences for their country, and it is this fear that has allowed the government to move so rapidly away from nuclear power.

A weaker German economy, which is showing up in the latest government economic statistics, appears partially due to its newly embraced energy strategy

As the powerhouse economy of Europe and the economic force binding together the European Union and controlling its financial future, Germany needs to continue to demonstrate its economic strength. For decades, but especially in the past few years, Germany has been the primary economic engine powering the eurozone, but now its economy is starting to weaken, which will make it increasingly more difficult to orchestrate a path for the eurozone out of its sovereign debt crisis. A weaker German economy, which is showing up in the latest government economic statistics, appears partially due to its newly embraced energy strategy but also due to a weakening global economy. The shift in the nuclear power strategy caused significant financial damage to

Germany is the world's fifth largest economy

the country's power companies and the cost of this policy shift is now impacting energy costs for Germany's manufacturing sector, the key source of the country's export strength. Germany is the world's fifth largest economy measured on purchasing power parity and is the globe's second largest exporting economy, only recently having been passed by China. The economy's export strengths are in machinery, vehicles, chemicals and household equipment.

All the electric utilities that depend on nuclear power have filed for €15 billion ($18.7 billion) in damages from the policy decision

The nuclear power plant phase out decision has created severe financial hardships for Germany's power companies. The country's largest utility, E.ON (EONGY-PNK), has filed a complaint with the Federal Constitutional Court in Karlsruhe seeking €8 billion ($10 billion) in damages. Collectively, all the electric utilities that depend on nuclear power have filed for €15 billion ($18.7 billion) in damages from the policy decision. Understand, the utilities are not challenging the government's right to make that decision, but rather they are appealing on the basis that there was no compensation offered to offset the financial costs of the accelerated shutdown of the plants. The Federal Constitutional Court has to answer the question of whether the action violated the constitution. The court will confer with both houses of the German parliament along with 63 other institutions including Greenpeace and the Federation of German Industry. No decision is expected before late 2013. This ruling must be made first before any civil courts can rule on possible damages.

In order to better understand the challenge of shifting Germany from nuclear power to renewable energy sources, the government participated in a recent German-Nordic conference held in Berlin, Germany. There the German Environment Minister Peter Altmaier said he regretted the unilateral course his country had taken. Instead, he wants to establish an international club of countries shifting to renewable fuels in order for members to learn from each other's experiences and to foster greater energy co-operation. The Nordic countries, which appear to be much further advanced in this energy transition than Germany and the rest of Europe, are willing to help its neighbors - voilà the conference.

Germany already has among the highest electricity rates in Europe and with the surcharge increase, will be competing for the highest rate

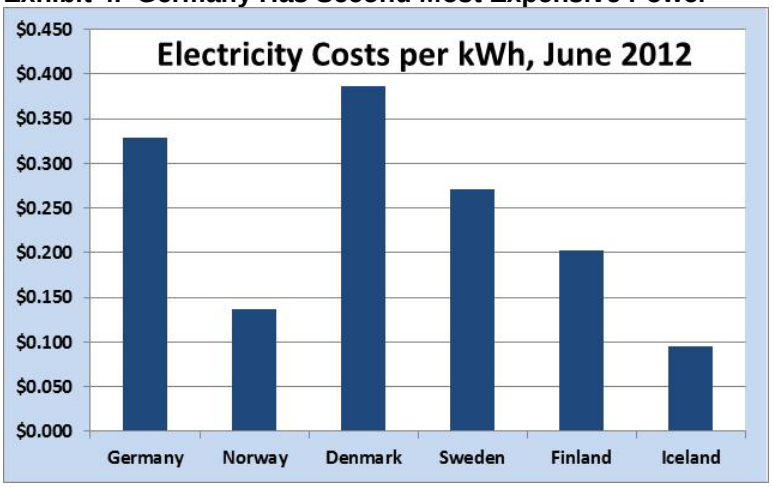
Germany already has a relatively high proportion of its electricity generated from renewables, but in order to meet the country's goal of phasing out nuclear power entirely by 2022 and replacing it with renewable energy, and in some cases power from fossil fuels, there is much that needs to be done. The bad news is that the German government has recently informed it citizens that the renewables surcharge for their electricity will jump by 47% next year. Germany already has among the highest electricity rates in Europe and with the surcharge increase, will be competing for the highest rate. This rapidly escalating power cost has not been lost on Germany's manufacturers. Recently, the chairman of VW (VLKAY-NASDAQ), Ferdinand Piëch, said, "High energy costs mean Germany is running the risk that some industrial sectors, like foundries or metalworking,

will disappear in the medium term." He went on to say that VW had switched to sourcing some products from outside of Germany. "The cost pressure has forced us to find other suppliers in other countries," Mr. Piëch explained.

The German industry association warned several weeks ago that the U.S. would enjoy "an energy-cost advantage compared with Europe and Germany until 2020 at the very least"

VW is among numerous German companies that have raised the alarm about Europe's ability to compete, especially as the U.S. rebuilds its manufacturing sector fueled by cheap natural gas from domestic shale resources. The German industry association warned several weeks ago that the U.S. would enjoy "an energy-cost advantage compared with Europe and Germany until 2020 at the very least." The timing is due to Europe's dependence on expensive natural gas contracts with Russia and Norway. The impact of these high-priced gas contracts is that German fuel prices could expand from currently being three-times more expensive than those in the U.S. to being four-times more expensive by 2020. At the same time, electricity prices could wind up being twice as expensive in Germany as in the U.S.

Exhibit 4. Germany Has Second Most Expensive Power

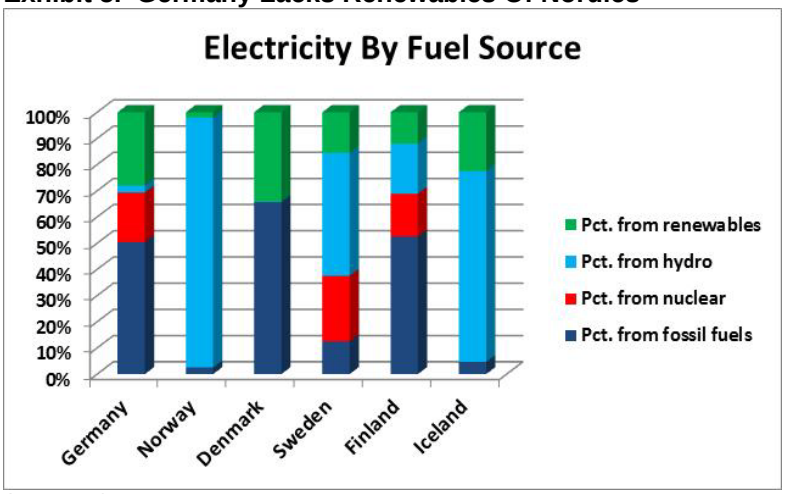


Source: PPHB

All these Nordic countries have geographic advantages or have adopted governmental policies that foster the increased use of renewable fuels

As German electricity costs are already nearly as expensive as Denmark's, the most expensive electricity among Nordic countries, the effort to phase out cheap nuclear power for more expensive renewable power runs the risk of seriously damaging the German economy. At the Nordic energy conference, representatives from the various countries and their utility industries outlined facts about how their particular country was handling the use and integration of increased renewable energy. The problem is that all these Nordic countries have geographic advantages or have adopted governmental policies that foster the increased use of renewable fuels. The greatest challenge for Germany is that it does not have large amounts of hydroelectric power or biomass opportunities such as in Finland, which is 86% covered with forests.

Exhibit 5. Germany Lacks Renewables Of Nordics



Source: CIA, PPHB

The variability of Germany's wind power is creating problems for the power grids in Poland and the Czech Republic

Another disadvantage for Germany is that it does not have the electric grid structure to move renewable power from its wind farms in the north and offshore regions to the industrialized southern region. Germany is attempting to integrate its renewable power sources with neighboring countries in hopes of swapping power. The problem is that the variability of Germany's wind power is creating problems for the power grids in Poland and the Czech Republic. The surplus wind power also has overwhelmed the grids in Hungary and Slovakia. The Czechs and Poles already are building transformers and phase-splitters along their border with Germany to better regulate the German power flow. However, they won't be completed before 2017. "We may very well have to shut down German access to our grids this winter," said Vaclav Bartuska, the Czech ambassador for energy security. He went on to say, "We've spoken to the Germans many times about this and all they say is they're going to build new transmission lines. This is good but it will take at least ten years. We can't wait that long. We have no other choice." However, the Germans believe its neighbors may have an agenda at play in this discussion because they see cheap surplus German power undercutting their offers of more expensive power to Central European countries with extremely high-cost electricity.

The German policy to shut down its nuclear power industry and replace it with renewable energy was a rash action undertaken without much thought

Thomas Sattich, energy expert at the German Institute for International and Security Affairs, argues that until Germany has its new power grid in place, Germany's Energiewende is likely to further exacerbate network fluctuations and intensify the need for tinkering with Europe's overall power system. More people are beginning to think the German policy to shut down its nuclear power industry and replace it with renewable energy was a rash action undertaken without much thought about its unintended consequences such as the damage to the nation's utilities and its manufacturing sector's competitive position in the world economy. Chancellor Merkel's

attempts to reconsider this policy may prove to be too little, too late for the health of the German economy. Americans should closely watch this German electricity drama as it could provide a foretaste for the United States should we enact an energy policy based on flawed assumptions that carry significant economic consequences due to their unintended consequences.

OPEC, Oil Markets And Their Future Challenges

All eyes are focused on the Middle East given the outbreak of conflict between Israel and Hamas in Gaza and the political turmoil in Egypt with President Morsi's move to capture dictatorial powers. As the Israeli conflict's flames began to moderate, the Egyptian ones flared up. Lurking always in the background is the issue of Iran and its efforts to develop a nuclear capability. These various events and tensions ultimately are a part of the extended Arab Spring that ended multiple dictatorial regimes in several countries in North Africa a couple of years ago.

Lurking always in the background is the issue of Iran and its efforts to develop a nuclear capability

The fallout from the Arab Spring, however, has changed oil market dynamics. The dynamics were altered by the high oil prices that evolved due to uncertainty about the possibility of wide-spread civil war among the oil producing countries in the Middle East and North Africa. The high oil prices provided a windfall of revenues for those governments, but also boosted the cost to stay in power for Arab regimes unwilling to yield greater political power to its people. The flip-side of high oil prices was the negative impact on global oil demand that needs to be satisfied by OPEC oil suppliers. OPEC's role has been further diminished by the explosion in tight and shale oil production in North America, a significant demand source, driven by technology and high oil prices.

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A new paper by Paul Stevens and Matthew Hulbert, published by Chatham House, discusses the issue of oil prices and how they impact energy investment, political stability in the oil exporting countries and create a dilemma for OPEC. The key premise of their analysis is that the fallout from the Arab Spring is driving Middle East and North African OPEC members' economic breakeven costs substantially higher than before the outbreak with the corresponding erosion in oil demand and a boost for unconventional oil production. The Chatham House authors suggest that the dilemma facing these countries is that "OPEC members need the golden eggs [high oil prices] at a rate that may well kill the goose that lays them."

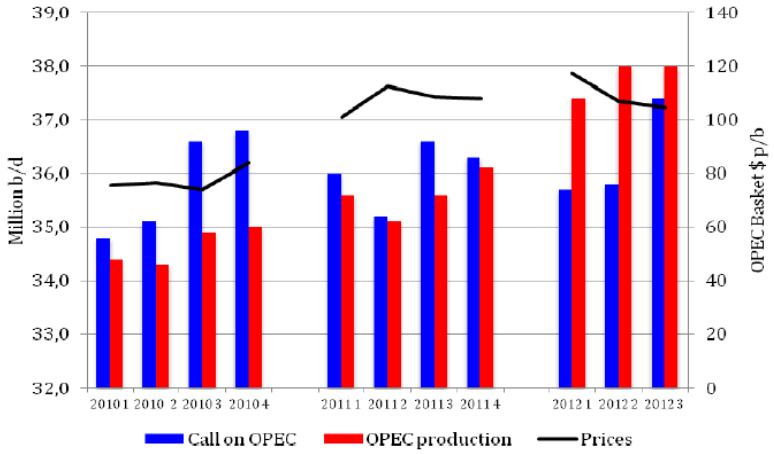
The relationship between global oil prices and OPEC's production is really tied to changes in global inventories

To better understand the challenge OPEC members are facing currently, the authors suggest one must understand that the relationship between global oil prices and OPEC's production is really tied to changes in global inventories that, in turn, are influenced by non-OPEC oil production and oil consumption rates. The authors show the trends in the demand for OPEC oil, OPEC's oil production and the level of global oil prices for the past 11

quarters. What is shown is that in the second half of 2010 demand for OPEC oil surged but OPEC elected not to increase its production commensurately. The underproduction continued throughout 2011, but by a much smaller amount in each of the four quarters. The outcome was that oil prices rose starting in the second half of 2010 and remained elevated throughout 2011. In 2012, however, OPEC began to step up its production, especially Saudi Arabia, in response to losses of production from Yemen, Egypt, Syria and the Sudan. Importantly, there was also the lost oil production from Libya. Additionally, OPEC began to prepare to meet the anticipated supply reduction from Iran that would come from the implementation of western governments' financial and trade sanctions designed to suppress the country's oil sales and income. The impact of the sharp increase in OPEC production in the first half of 2012 was to bring oil prices down. In essence, the authors contend, it was the change in oil inventories that resulted from the demand increase with only a marginal supply boost during 2010 and 2011 that drove prices up. With higher oil prices and a continued weak global economy, oil demand fell at the same time OPEC was boosting production. The combined trends resulted in increasing inventories and falling oil prices.

With higher oil prices and a continued weak global economy, oil demand fell at the same time OPEC was boosting production

Exhibit 6. OPEC Actions And Oil Prices



Source: IEA

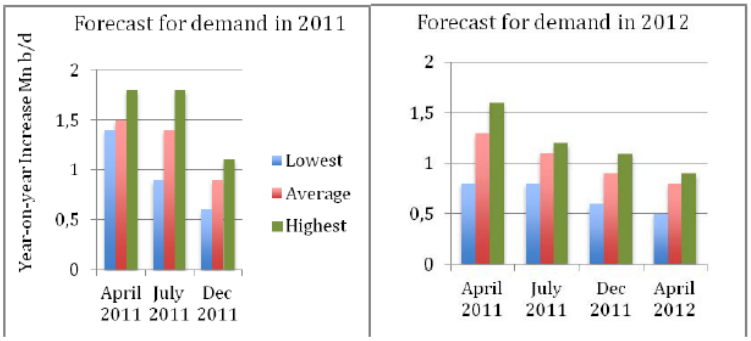
The International Energy Agency (IEA) in its World Energy Outlook 2011 identified the Middle East, India and China (the MICs) as accounting for 68% of the oil demand growth in the non-OECD countries between 2009 and 2035. All three of the MICs have long subsidized oil prices for their citizens. This is undergoing significant change, beginning in India in 2002 and in China in 2009. Recently, Egypt announced it would be ending its massive energy subsidies for its citizens. This is a phenomenon we have written about in the past. As the developing economies come to grips with the cost of subsidizing energy consumption in their countries and eliminate, or at least severely reduce the subsidies, energy demand growth will

All three of the MICs have long subsidized oil prices for their citizens

begin to slow. As these market dynamics gain traction, we are seeing forecasts for oil demand growth falling. The authors presented a chart of the projections for oil demand growth in 2011 and 2012 made by eight independent energy forecasters at different times in the past two years, and how these forecasts showed a steady decline. As they wrote: "The later the forecast, the lower the average of the eight projections." In the past we have shown how, since 2004, the trend in annual oil demand growth forecasts made by the IEA has consistently trended lower over time. In our view, this over-zealous forecasting by the IEA was an institutional response to its failed China demand forecasting model that caused the agency to grossly underestimate that country's demand in 2004. The extraordinary demand increase that year was a direct reflection of the government's higher infrastructure construction in preparation for the 2008 Olympics creating an electricity shortage that was remedied by the use of portable generators requiring gasoline.

"The later the forecast, the lower the average of the eight projections"

Exhibit 7. Oil Price Forecasts Trend Lower With Time



Source: Stevens and Hulbert

Based on the work of Ali Aissaoui of Apicorp Economic Commentary this summer, he has established the median budgetary breakeven price for the 12 members of OPEC. Qatar has the lowest required price at about $50 per barrel while Iran has the highest at about $125 per barrel. Saudi Arabia, the key to global oil supply, has an estimated breakeven price of $94 per barrel. Increasingly, other major oil suppliers, including Russia, Mexico and the Caspian states all need oil prices in the $100 per barrel range in order for their governments to breakeven. (See Exhibit 8 on next page.)

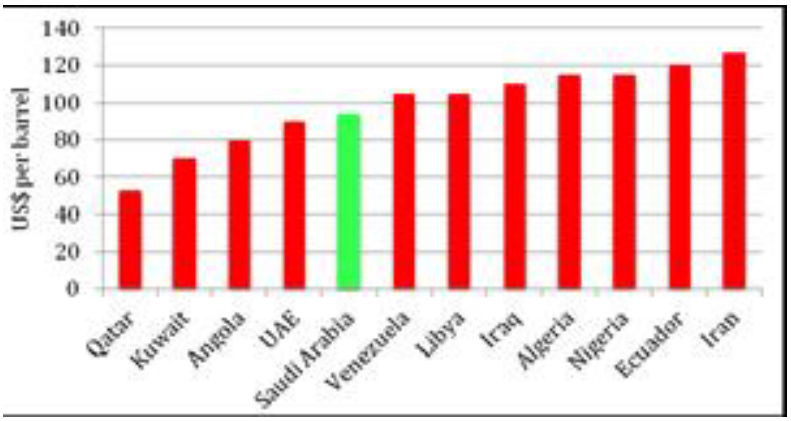
Saudi Arabia, the key to global oil supply, has an estimated breakeven price of $94 per barrel

The authors characterize the oil market environment we are heading into in 2013 as much like the 2008 market. At that time there was another commodity market boom in the midst of extreme financial and economic uncertainty. The key difference is that unlike 2008 when it was assumed that sovereign balance sheets could support private-sector failures, things are considerably worse this time. Today it is the solvency of the central banks that is being tested by the market and there is no "lender of last resort" and no safety net to fall back on for advanced economies. As the authors describe the current environment, "The eurozone remains fundamentally broken,

The key difference is that unlike 2008 when it was assumed that sovereign balance sheets could support private-sector failures, things are considerably worse this time

the United States is (ironically) rebuilding its economy on its own energy gains and whatever excess cash sovereign wealth funds in the Middle East and North Africa once had is staying home."

Exhibit 8. OPEC Member Breakeven Prices



Source: Apicorp Economic Commentary

The dilemma for OPEC is that high oil prices are driving growth in unconventional oil output and expanding the universe of oil suppliers

Given the outlook for the oil market, the authors believe there are three likely scenarios for OPEC members should oil prices go much lower (below $80 per barrel). These scenarios are: a price war forcing prices even lower; a period of internal repression may develop as oil revenues fail to enable governments to buy peace among the citizen populations; and internal unrest among producers, which could lead to supply disruptions followed by prices bouncing back up. The dilemma for OPEC is that high oil prices are driving growth in unconventional oil output and expanding the universe of oil suppliers. The technologies that have successfully unlocked shale gas resources are increasingly being directed to tight and shale oil resources with meaningful production outcomes. Because unconventional oil plays have much higher variable costs, supply is much more responsive to price in the short-term than was experienced with conventional oil plays. High oil prices will induce and maintain higher production, a phenomenon we are witnessing today. It is this new dynamic in the oil market that creates OPEC's dilemma. Its members need higher prices now and in the near future to forestall domestic unrest. At the same time, however, higher prices destroy demand and encourage growth in non-OPEC oil supplies that ultimately will lead to lower prices. OPEC needs the golden eggs of high oil prices and high oil revenues, but it needs them at a rate that may ultimately kill the goose. The question is the timing. According to the authors, one can look to the 1980s for a test of this thesis, and one finds that it required nearly 13 years from the first jump in oil prices in 1973 to the crash in oil prices in 1986. OPEC had tried to defend against the killing of the golden goose in 1982, but it failed four years later. The authors believe, and we concur, that current market forces would significantly compress that reality today.

The Perversion Of Green Energy Credits And Server Farms

Google now has nearly $1 billion invested in various green energy projects both here and in Germany that are not tied to the company's data center power needs

Several media outlets have carried stories recently about the $75 million investment by on-line search provider Google (GOOG-NASDAQ) in an Iowa wind farm, continuing the company's status of being 100% carbon-neutral since 2007 through a combination of renewable-energy investments, renewable-power purchase agreements and green-credit purchases. The new wind farm investment is in RPM Access, but represents a targeted investment in green energy. Google now has nearly $1 billion invested in various green energy projects both here and in Germany that are not tied to the company's data center power needs. The investment is part of a portfolio of large-scale renewable energy projects including massive photo-voltaic farms, rooftop-solar financing programs, solar-thermal and wind farms.

The company sells the output from the wind farm into the electricity grid, but strips green credits from it, applying them to the electricity it buys to power its data center

At the same time the company made the wind farm investment, it invested in a project to expand its server facility in Iowa, raising its total infrastructure investment in that state to $1.1 billion. In the case of this data server facility, in 2010, Google signed a 20-year power purchase agreement to buy all the energy generated by a 114 megawatt (MW) wind farm in Stony County, Iowa. The company sells the output from the NextEra Energy Resources Story County II wind farm into the electricity grid, but strips green credits from it, applying them to the electricity it buys to power its data center.

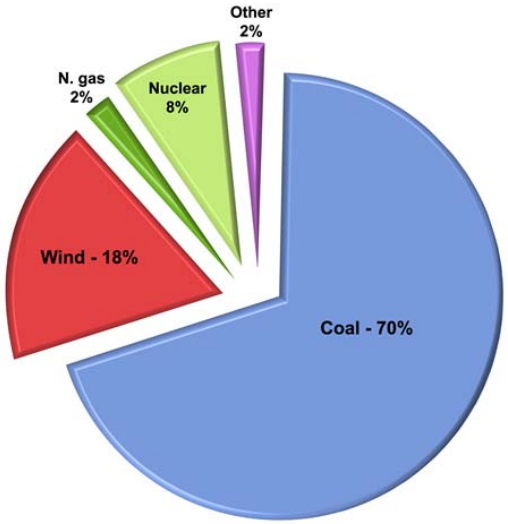
Iowa is ranked third for installed wind generating capacity behind Texas and California

At the present time, there are nine other major data centers located in Iowa, including a major facility for Microsoft (MSFT-NASDAQ). Rumors abound that Facebook (FB-NASDAQ) is planning to build a $1.5 billion data center in Iowa. So why are all these internet companies attracted to Iowa? It appears part of the draw is that Iowa offers attractive tax breaks and refunds to data center owners. In addition, the state has a low risk for natural hazards such as floods, earthquakes, hurricanes and tornadoes, but the real reason, according to the Iowa Economic Development, is that "Iowa has one of the lowest costs for power in the nation," and "[Power] reliability is also something you can count on in Iowa." So is the state's low cost power all due to its wind farms? Iowa is ranked third for installed wind generating capacity behind Texas and California.

Iowa's low cost power may have more to do with the fact that 70% of it is generated from coal

Energy-facts.org, the web site operated by Dr. Frank Clemente, Professor Emeritus of social science and energy policy at Penn State University, and Mark Mills, a physicist and co-author of The Bottomless Well, has done an interesting dissection of the Iowa power market. Iowa's low cost power may have more to do with the fact that 70% of it is generated from coal. Wind does represent 18% of the state's total electricity output, but nuclear power accounts for nearly half that amount.

Exhibit 9. Iowa Power Generations Fuels

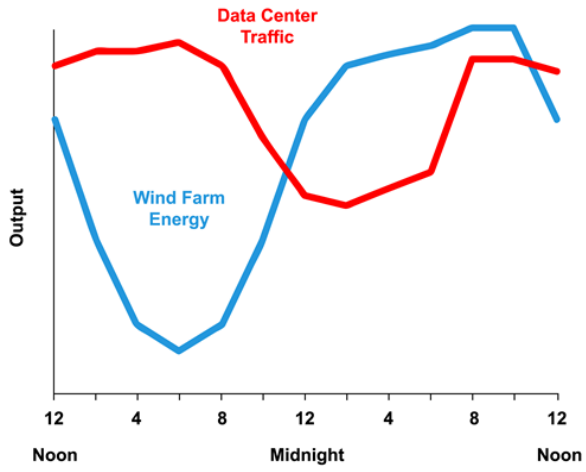


Source: ***energy-facts.com***

The wind tends to blow at night, generating electricity that is out of phase with when the data center's traffic demand is the highest and needs the power

The fact that Google, and we suspect other data center operators, strip the green credits off their wind investments to apply to the power used by their centers, suggests that not all megawatts of electricity are equally useful. This is another way of saying that wind power often is not generated at the time of day when data center electricity demand is high. For grid-scale data centers, electricity has to be available when demanded by the internet traffic, and at a price that is acceptable, i.e., cheap. As the chart in Exhibit 10 demonstrates, the wind tends to blow at night, generating electricity that is out of phase with when the data center's traffic demand is the highest and needs the power.

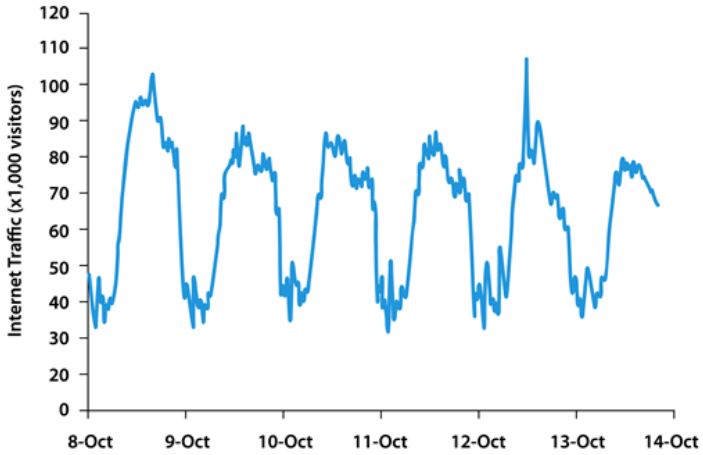
Exhibit 10. Mismatch In Demand v. Wind Power Supply



Source: ***energy-facts.com***

Besides the daily fluctuations, data from Akamai (AKAM-NASDAQ) shows that the internet traffic at one of its typical data centers shows significantly different daily demand patterns during the course of a week.

Exhibit 11. Data Center Power Needs Cycle Daily

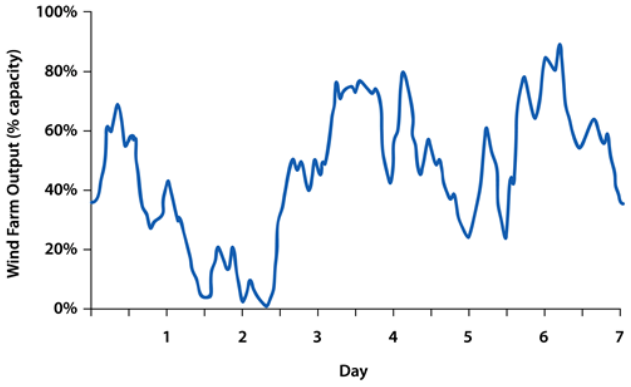


Source: ***energy-facts.org***

To make wind a reasonable alternative, one needs to build 3 MW of wind generating capacity for every 1 MW of coal-fired power in order to achieve the same average annual output

When we look at the power output from a typical 550 MW wind farm as presented by RISO National Laboratory, it can vary widely. The weekly power variability contrasts significantly with the weekly power needs of data centers making it impossible for wind power to supply electricity when needed. As a result, the data center owners are forced to rely on alternative – mostly fossil fuel powered – supplies of electricity. To make wind a reasonable alternative, one needs to build 3 MW of wind generating capacity for every 1 MW of coal-fired power in order to achieve the same average annual output. And even then, there is still no way to guarantee that the wind power will be generated when it is needed.

Exhibit 12. Weekly Wind Power Output Volatile

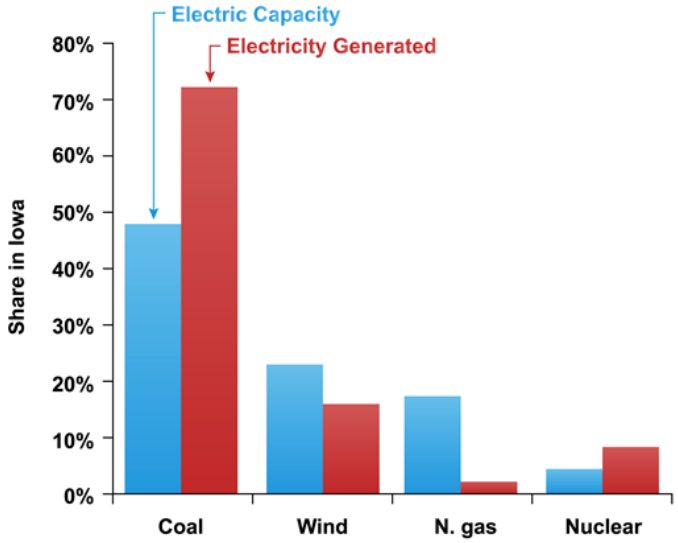


Source: ***energy-facts.org***

Iowa has less than 50% of its installed generating capacity fueled by coal, but it produced 70% of its electricity

Data from the Iowa Utilities Board shows an interesting, but common, electricity picture. The chart in Exhibit 13 shows the installed electric generating capacity by fuel source compared to the amount of electricity actually generated. As shown, Iowa has less than 50% of its installed generating capacity fueled by coal, but it produced 70% of its electricity. On the other hand, wind generating capacity was about 22% of the total, but its power output was only 18%. Nuclear installed capacity was about 4%, yet it generated 8% of total electricity produced.

Exhibit 13. Wind Generating Capacity Underperforms



Source: ***energy-facts.org***

For all the wind farms built in Iowa, more natural gas-powered plants are constructed in order to be ready to generate electricity when the renewable plants, such as wind, cannot generate power

The most interesting aspect of the chart is the comparison of the amount of power generated from natural gas powered facilities versus the installed natural gas generating capacity. It looks like about 18% of capacity produced 1-2% of output. This suggests, as we have known for a long time, that for all the wind farms built in Iowa, more natural gas-powered plants are constructed in order to be ready to generate electricity when the renewable plants, such as wind, cannot generate power. This is part of the unintended costs of building wind farms. It is one of the costs never discussed by renewable power proponents, but more importantly, it is one of the weaknesses in the argument for trying to make a high percentage of the grid's capacity dependent upon intermittent power sources.

Oil Market Dislocations And Gasoline Prices In Texas

Thanksgiving week we were treated to a true example of the results of the pricing dislocation in the domestic oil market. Most of us are familiar with the discount between West Texas Intermediate (WTI)

When Phillips announced an extra week of maintenance, Permian's crude oil price fell to a $20 per barrel discount from WTI, $66 versus $86 per barrel

crude oil and the world price for Brent (North Sea) oil. That discount primarily reflects the logistical challenge facing the petroleum industry in shipping additional oil volumes between the central gathering point for oil in Cushing, Oklahoma to the industry's refining center along the Gulf Coast. These "take away" issues – the ability of the industry to move greater volumes of lower-priced crude oil from the central United States and Canada – can create truly vicious price swings in the oil trading market. The most recent example was what happened to oil from the Permian basin in West Texas when the Phillips refinery in Borger, Texas failed to return to operation as scheduled following its maintenance hiatus. When Phillips announced an extra week of maintenance, Permian's crude oil price fell to a $20 per barrel discount from WTI, $66 versus $86 per barrel.

The lower Cushing oil price translated into a meaningful discount to the cost for gasoline in Houston that comes from Gulf Coast refining complex, which is largely supplied with international oil, i.e., expensive oil

Right before leaving to drive to Keller, Texas for Thanksgiving, we filled up with regular gasoline at $3.219 per gallon in Houston. That price was one of the lowest among the gasoline stations surrounding our home. A few days later we filled up the car at a Quick Times (QT) station in Roanoke, Texas, just north of Keller, and paid $2.999 per gallon, or 22¢ less than in Houston. Guess where the QT gasoline comes from? How about Oklahoma? We noticed Oklahoma on the license plate of the truck hauling fuel to the station and the company's address on the truck's door. The lower Cushing oil price translated into a meaningful discount to the cost for gasoline in Houston that comes from Gulf Coast refining complex, which is largely supplied with international oil, i.e., expensive oil.

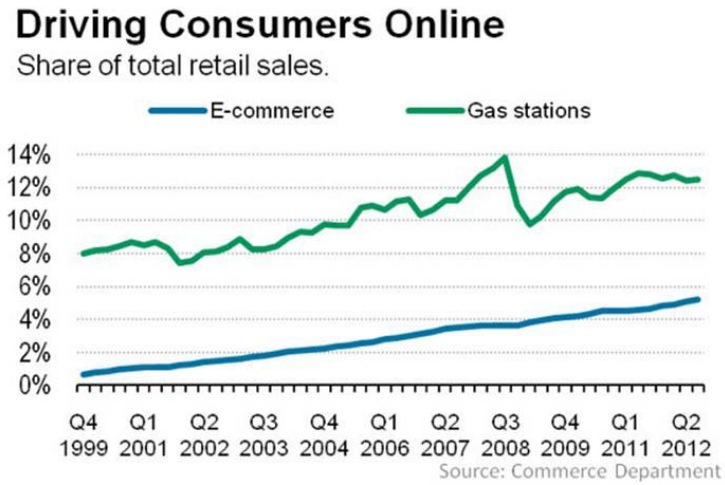
The problem is that Rhode Island gasoline prices were 24¢ per gallon above the national average

We were further reminded of the impact on regional gasoline prices based on the source of their crude oils when we saw a recent newsletter article on gasoline pump prices in Rhode Island. The New England region of the country largely depends on gasoline supplies either refined from imported oil in the few regional refineries in the East or actually imported from foreign refineries. The article stated that retail gasoline prices in Rhode Island at that time were $3.41 per gallon, down 5¢ from a year ago. The article also pointed out that pump prices had fallen by 5¢ per gallon in the prior week, and 23¢ overall in the past month. The problem is that Rhode Island gasoline prices were 24¢ per gallon above the national average.

Currently, gasoline accounts for slightly over 12% of retail sales

We found all of this information interesting, but even more so when we saw the chart in Exhibit 14. It shows the significance of gasoline sales on consumer budgets since the turn of this century. From 8% of retail sales in the fourth quarter of 1999, gasoline sales peaked out accounting for 14% of retail sales in the third quarter of 2008, just at the start of the financial crisis. Currently, gasoline accounts for slightly over 12% of retail sales. It is interesting to compare the growth of gasoline sales as a percent of retail sales to the growth in E-commerce (sales conducted on the Internet). The increase in E-commerce has reflected a steadier pace of growth and has risen from slightly under 1% at the end of 1999 to about 5% now. The four percentage point increase about equals the magnitude of the

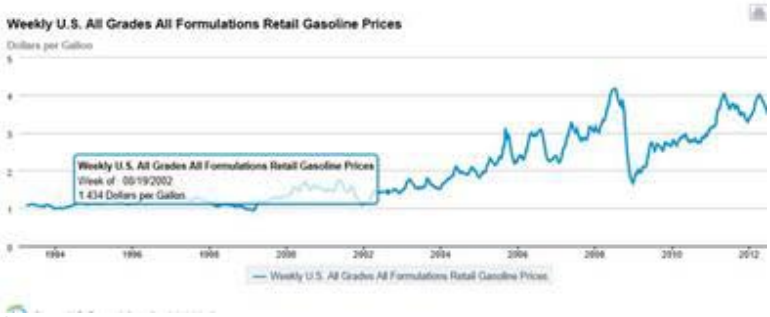
Exhibit 14. Gasoline Claims High Share Of Sales



Source: Real Time Economics

gain in share of gasoline sales claimed over the same period. Gasoline's share of retail sales increased more and quicker than did E-commerce sales if one measures to the mid-2008 record peak.

Exhibit 15. Rising Prices Drive Retail Sales



Source: EIA

With falling gasoline prices and demand flat to down, the percentage of retail sales that service stations represent is likely to decline in the future

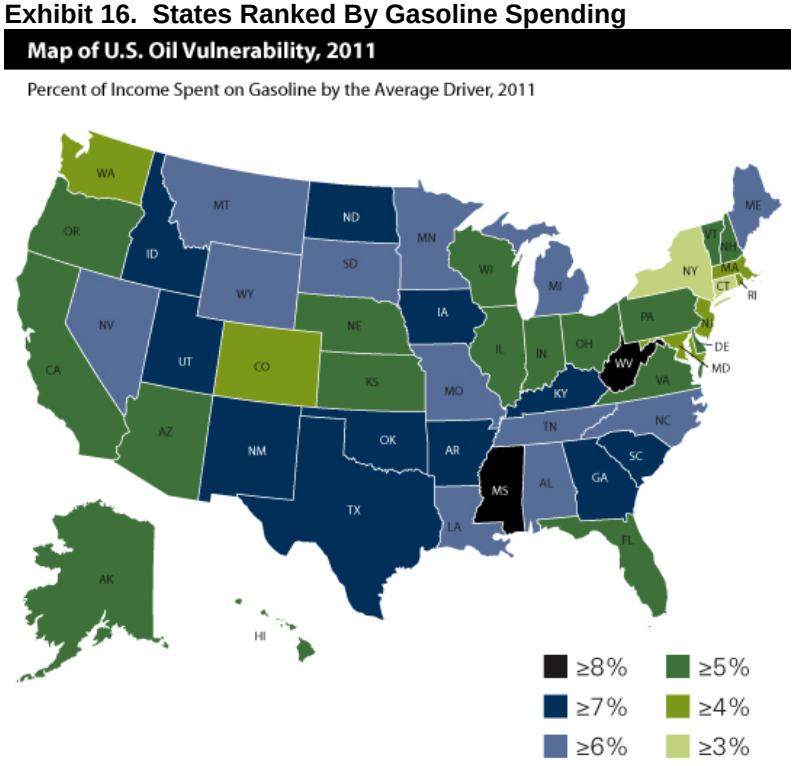
Part of the explanation for the increase in gasoline sales as a percentage of total retail sales is the rise in gasoline pump prices. At the end of 1999, gasoline prices averaged about $1.30 per gallon and then climbed until they peaked at slightly over $4 per gallon. Gasoline prices during the third quarter averaged about $3.60 per gallon. Given this magnitude of a rise in pump prices, it is not surprising that gasoline sales would account for a larger share of total retail sales. With falling gasoline prices and demand flat to down, the percentage of retail sales that service stations represent is likely to decline in the future. E-commerce sales, however, are likely to continue climbing as they have done for the past dozen years.

Another aspect of gasoline sales is the magnitude of their claim on the average citizen's income. The National Resource Defense Council (NRDC) released its sixth annual study of oil vulnerability for

The study rated the states based on the amount of average per capita income spent on gasoline

individual states conducted for them by David Gardiner & Associates (DGA). The study rated the states based on the amount of average per capita income spent on gasoline, which puts citizens of the states with the highest gasoline spending at risk of price spikes. The study has a second consideration, which is to assess those states doing the most to promote a shift away from gasoline-powered vehicles in favor of mass transit and those who are promoting "green" transportation measures such as tax credits for buying zero emission vehicles (ZEM).

Exhibit 16. States Ranked By Gasoline Spending



Source: NRDC

The list of the ten states with the greatest percentage of income spent on gasoline shows a preponderance of Southern states

According to the research, there were two states in which the average licensed driver is estimated to have spent in excess of 8% of his/her income in 2011. The list of the ten states with the greatest percentage of income spent on gasoline shows a preponderance of Southern states, which tend to have lower per capita incomes than many other states in the Union. Additionally, these states tend to have smaller populations and fewer large cities, eliminating mass transit as a meaningful transportation option.

Exhibit 17. Ten Most Vulnerable States To Oil Price

Which States' Drivers Were Most at Risk in 2011?

Research by DGA & NRDC shows that the 10 states whose drivers spent the largest percentage of their income on gasoline in 2011—or, in other words, faced the highest degree of gasoline price vulnerability—were:

1. Mississippi – 8.98% (also #1 in 2010, 2009, 2008, 2007, and 2006)
2. West Virginia – 8.10% (↑ from #16 in 2010)
3. South Carolina – 7.91% (↓ from #2 in 2010)
4. Kentucky – 7.89% (↓ from #3 in 2010)
5. Oklahoma – 7.56% (↑ from #6 in 2010)
6. Texas – 7.30% (↑ from #17 in 2010)
7. Georgia – 7.21% (↓ from #4 in 2010)
8. Iowa – 7.18% (↑ from #9 in 2010)
9. New Mexico – 7.13% (↑ from #10 in 2010)
10. Arkansas – 7.10% (↓ from #8 in 2010)

Source: NRDC

On the other end of the spectrum from the NRDC's point of view are those states doing the most to offset whatever oil price vulnerability they have. This list is in Exhibit 18. It is not the same grouping of states with the least oil price vulnerability, although Connecticut is rated as the state with the least oil vulnerability.

Exhibit 18. States Working To Reduce Oil Vulnerability

1. California	6. Connecticut
2. Oregon	7. Maine
3. Washington	8. Maryland
4. Massachusetts	9. Rhode Island
5. New York	10. Vermont

Source: NRDC

When one looks at the ten states with the least oil vulnerability, there is a 60% overlap with those states working the most to minimize their vulnerability. The ten states with the least oil vulnerability,

We believe the latest NRDC study is merely the opening salvo in the next battle to be waged over energy policy and President Barack Obama's green energy agenda

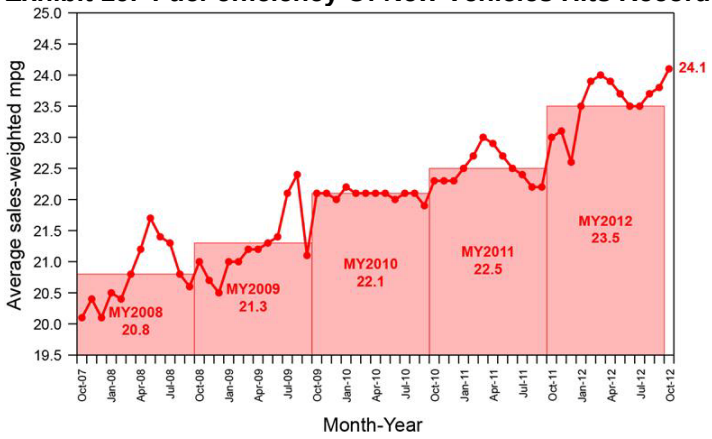
ranked in inverse order are: Connecticut, New York, New Jersey, Rhode Island, Massachusetts, Washington, Colorado, Hawaii, Maryland and Pennsylvania. Two of those states, New York and New Jersey have recently had to deal with the impact of their oil vulnerability and may decide they want to devote more state income to reducing their vulnerability. Of course, it would be much easier if they could tap the federal treasury, an effort I expect to see shift into high gear during the lame duck Congressional session and while empathy is high for the states. We believe the latest NRDC study is merely the opening salvo in the next battle to be waged over energy policy and President Barack Obama's green energy agenda.

America's New Vehicle Fleet Gains Fuel-Efficiency Record

For October 2012, the fleet sold, based on window sticker fuel-efficiency values, reached an average of 24.1 mpg

Two researchers with the Transportation Research Institute at The University of Michigan have been tracking the monthly fuel efficiency performance of the new light-duty vehicle fleet sold in the United States since October 2007. They recently reported that for October 2012, the fleet sold, based on window sticker fuel-efficiency values, reached an average of 24.1 miles per gallon (mpg). That was an increase of 4.0 mpg greater than the 20.1 mpg average in October 2007, an increase of 20%. The Institute publishes a graph of the data since it began monitoring it in October 2007.

Exhibit 19. Fuel-efficiency Of New Vehicles Hits Record



Source: Univ. of Michigan

Fuel economy declined to 11.9 mpg in 1973, at the time of the first OPEC oil price shock

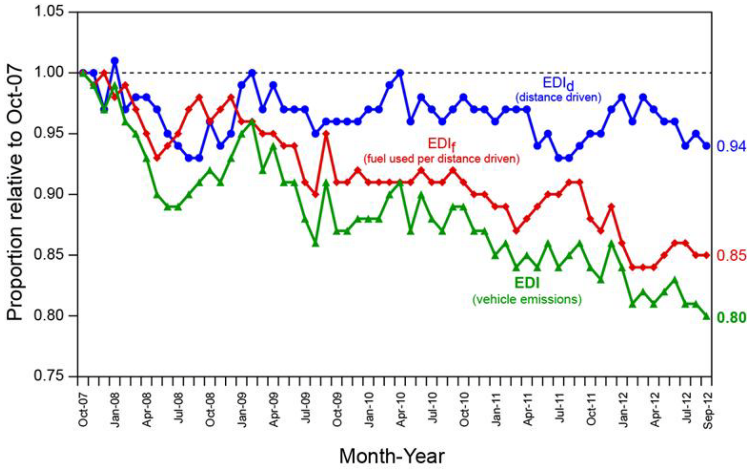
The Institute pointed out that in 1923 the actual, on-road fuel economy of the entire American vehicle fleet (including cars, trucks, buses and motorcycles) was 14.0 mpg. Fuel economy subsequently declined to 11.9 mpg in 1973, at the time of the first OPEC oil price shock. It then began to climb rapidly reaching 16.9 mpg in 1991. The changes in fuel economy thereafter have been small, with overall fuel economy in 2007 only at 17.2 mpg. The data for cars only shows a similar trend with a decline in fuel economy until 1973, then a relatively sharp improvement from 1973 through 1991 and then only minor improvements until 2007.

Because of the improved fuel economy, the vehicles sold since October 2007 saved a cumulative total of about 6.1 billion gallons of fuel

According to Michael Sivak, one of the researchers, "The improvement in fuel economy in the past five years corresponds to a 17 percent reduction in fuel consumption per distance driven." What that means is because of the improved fuel economy, the vehicles sold since October 2007 saved a cumulative total of about 6.1 billion gallons of fuel. This is the equivalent of the current total fuel consumption of all vehicles in the United States for about 13 days. Importantly, the fuel savings also translates into a reduction of about 120 billion pounds of carbon-dioxide emissions.

The Institute also publishes an Eco-Driving Index to show the emissions savings from the increased fuel-efficiency of the new light-duty vehicles sold. The index shows the average monthly emissions generated by individual U.S. driving. The lower the number in this index the greater the emissions improvement. The latest data for the index is for August and it was 0.81. There has been a 19% improvement since the Institute began measuring this data in October 2007.

Exhibit 20. Vehicle Emissions Continue To Fall



Source: Univ. of Michigan

The combination of more fuel-efficient vehicles and fewer miles being driven is leading to fewer emissions. That has to be a good thing for the U.S. population, albeit not necessarily for the automobile industry and its various suppliers, nor for the energy business.

Cape Wind Project Moves One Step Closer To Reality

The Massachusetts DPU approved a PPA between Cape Wind and the state electric utility NStar

Last week the Massachusetts Department of Public Utilities (DPU) approved a power purchase agreement (PPA) between Cape Wind and the state electric utility NStar for 27.5% of the 468-megawatt wind farm's output. In 2011, the DPU had approved a PPA between Cape Wind and National Grid for 50% of the output. Cape Wind is now in a position to seek financing to construct the 77.5% of the

wind farm's output contracted that will require the installation of 101 of the planned 130 wind turbines in Nantucket Sound. The project still is subject to lawsuits from opponents challenging several of the federal approvals.

The NStar agreement provides for a price of 18.7 cents per kilowatt-hour (kWh) when the project commences operation and a 3.5% annual increase in that base charge every year of the 15-year contract. The project is scheduled to begin construction by the end of 2013 and the wind farm placed into service by the end of 2016, or Cape Wind would face financial penalties. The DPU estimated that the range of base costs for the NStar output at between 18.6 and 23.5 cents/kWh, depending on the final size of the project, the availability of tax credits and the cost of financing. The analysis of the economics of the wind farm for NStar customers shows that the rates will be anywhere from $438 million to $513 million above market costs during the life of the contract. The rationale for approving this above-market PPA was that the DPU believes the "unquantified benefits" exceed the costs. As the DPU wrote in its opinion, "When these benefits are compared with the likely range of net (including price suppression) above-market costs of $438 million and $513 million, we find that the unquantified benefits exceed even the high end of the likely range of above-market costs. Therefore, we find that the expected benefits of the PPA to NStar Electric customers exceed the expected costs to NStar Electric customers." So while the DPU commissioners can't quantify these benefits, they know they exist and that their value is greater for the NStar customers than the known costs they will have to shell out to buy power for the next 15 years that can never decrease due to the annual price escalator. I wonder how many bridges the commissioners own?

The rationale for approving this above-market PPA was that the DPU believes the "unquantified benefits" exceed the costs

Exhibit 21. Wind Energy Needs Government Help

Source: EIA

A key to the transaction is the extension of the Production Tax Credit (PTC) or Investment Tax Credit (ITC) for renewable energy projects. The lobbying for their extension, which is scheduled to expire on

The drive is to get the ITC extended since it covers 30% of the cost of the project and is not subject to the amount of electricity generated

December 31, 2012, is intense. The drive is to get the ITC extended since it covers 30% of the cost of the project and is not subject to the amount of electricity generated, while the PTC rewards the wind farm operator with 2.2 cents/kWh for electricity generated. The prospect of the PTC and ITC not be extended has cost thousands of workers in the wind turbine manufacturing business their jobs.

The economics of offshore wind are highly questionable and the industry has depended on subsidies and mandates for its survival

The economics of offshore wind are highly questionable and the industry has depended on subsidies and mandates for its survival. Of course, in the 20 years of PTC and 12 years of significant expansion of renewable power mandates, no offshore wind project has been constructed. At the rate we are going, it appears it may be another two years before Cape Wind, or possibly the Bluewater Wind project off Block Island, gets built. Then again, without an extension of the tax credits and subsidies, we wonder what the cost will be for the projects to secure financing. Maybe the second Obama administration will find some loose change in their clean energy fund to help out.

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