

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

ExxonMobil, Climate Change And Free Speech – The Case

Using their privilege of making claims from the floor of the Senate where a politician cannot be legally attacked for his speech

Recently, 19 Democratic Senators undertook an effort to “call out” conservative organizations that have produced research and policy papers questioning the orthodoxy of climate change. Using their privilege of making claims from the floor of the Senate where a politician cannot be legally attacked for his speech under Article I, Section 6, Clause 1 of the United States Constitution. However, these legislators wasted taxpayer money (the Senate had to be in session so that meant staffers had to be paid) in attacking the free-speech rights of the companies, individuals and organizations to question the “settled” science of climate change.

Survey results show the issue ranks at the bottom of the public’s concern about social issues

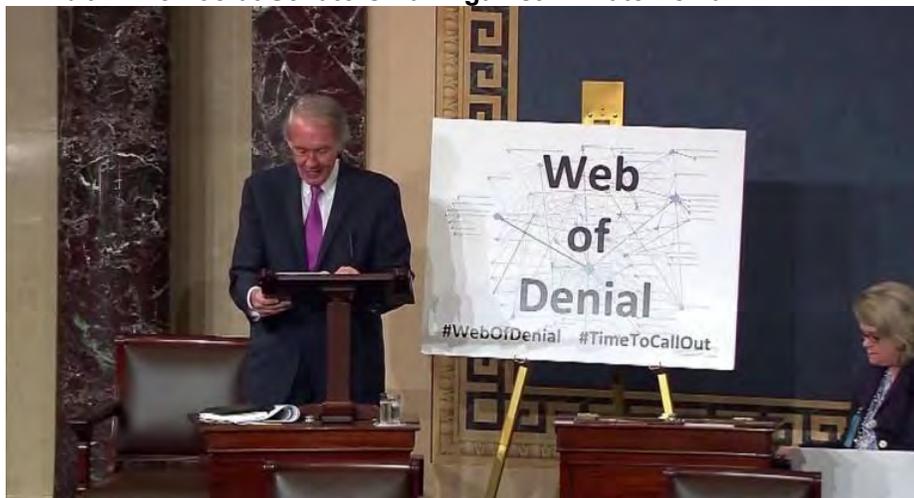
This three-day affair, “Web of Denial,” led by Senator Sheldon Whitehouse (D-RI), a career politician representing a state with barely over one million in population and ranking at the bottom of most economic performance measures and rankings for the state’s attractiveness for doing business, was the latest effort to promote the flagging climate change movement. Despite that attempts to promote and scare the public about the impact of climate change, survey results show the issue ranks at the bottom of the public’s concern about social issues. The climate change movement also took a blow following the change in the UK’s government leadership following the nation’s Brexit vote to secede from the 28-nation European Union. The country installed a new prime minister, Theresa May, who promptly eliminated the Department of Energy and Climate Change, shifting its duties to the Department of Business, Energy and Industrial Strategy. Climate change proponents attempted to put the best face on this situation by saying it was more appropriate that climate policy be moved to the business department that would be implementing policies to promote actions to deal with the issue. Unfortunately, that argument doesn’t square with the recent decisions to back away from adding

Questions are now being raised over what will happen to the Paris Climate Change Agreement negotiated last fall

more wind energy projects and the country's need to reactivate mothballed coal-fired power plants to meet winter energy demands.

What happened in Britain was just the latest example of the re-examination of the role of renewables in European economies such as Germany and Denmark. Both countries are being forced to back away from the embrace of renewables due to what the cost of these renewable fuel subsidies have done to power costs, their impact on the operation of the power grid and the countries' economies. Questions are now being raised over what will happen to the Paris Climate Change Agreement negotiated last fall as European countries challenge the renewables mandate.

Exhibit 1. Democrat Senators Rail Against Climate Denial



Source: PJ Media

The Democrats have enlisted the help of a handful of state attorneys general, mostly from states led by Democratic governors, to sue ExxonMobil for "fraud" over its supposed efforts to promote the continued use of fossil fuels

The centerpiece of the latest climate change dustup is Exxon Mobil Corp. (XOM-NYSE). The company has become the target of the progressive, climate change movement, which has seized on the concept of targeting the fossil fuel industry with the Racketeer Influenced and Corrupt Organizations Act (RICO). This law was used against the tobacco industry and has become the popular way to attack fossil fuel companies and their "supporters." The Democrats have enlisted the help of a handful of state attorneys general, mostly from states led by Democratic governors, to sue ExxonMobil for "fraud" over its supposed efforts to promote the continued use of fossil fuels while "secretly" hiding the knowledge that the carbon dioxide emissions from burning these fossil fuels would create a climate Armageddon. ExxonMobil has been at the center of these attacks, but several think-tanks, and a handful of climate scientists holding contrary views about the potential damage from climate change (formerly known as global warming until we entered an 11+ year hiatus of rising temperatures) have also been targeted for holding their views.

ExxonMobil has no offices in Puerto Rico, nor does it do any business there, raising the question of what legal standing the AG had

The absurdity of the attacks was highlighted when the attorney general from Puerto Rico subpoenaed ExxonMobil for documents to build its case against the company. ExxonMobil has no offices in Puerto Rico, nor does it do any business there, raising the question of what legal standing the AG had. Despite his bluster that it was all about the common good, he later withdrew his subpoena. That episode shined a spotlight on what this campaign is truly about – another cog in a broader progressive movement to suppress freedom of speech for conservative political groups or who openly question the views of progressives.

We urge people to read the book

We have just finished reading Kimberley Strassel's recently published book, The Intimidation Game: How The Left is Silencing Free Speech. We urge people to read the book. Ms. Strassel is the Washington-based writer of the weekly column "Potomac Watch" for *The Wall Street Journal*. She has an interesting background having been educated at Princeton University (often cited as a locus of the progressive movement, having been led by Woodrow Wilson, who championed the progressive movement) and is a 22-year veteran of the newspaper. She began working for the *WSJ* in Brussels and subsequently moved to London to cover technology. She joined the *Journal's* editorial page shortly after moving to the U.S. in 1999. She continues in this role along with writing her column that started in 2005. We have been fortunate to hear her speak twice and were quite impressed with her knowledge and presentation skills.

You may remember that President Barack Obama attacked this decision during his 2009 State of the Union speech

Ms. Strassel's book is an analysis of the moves by the occupant of the White House and carried out by its ideologically-in-step agency bureaucrats at the Internal Revenue Service, the Federal Election Commission, the Environmental Protection Administration, the Housing and Urban Development Department, and even in the halls of Congress, to silence opposition speech. This entire effort, of which Sen. Whitehead's effort is a part, emerged from the Supreme Court's ruling in the 2008 *Citizens United* case holding that corporations were entitled to the same freedom of speech rights flowing from political campaign funding that union organizations and individuals possess. You may remember that President Barack Obama attacked this decision during his 2009 State of the Union speech with the members of the court sitting immediately in front of him. Of course, the facts and the interpretation of the decision were twisted in his speech for political purposes, to the point the Associate Justice Samuel Alito mouthed the words "You're wrong."

The *Citizens United* case involved the makers of a movie critical of 2008 presidential candidate Hillary Clinton who wanted to show the film during the campaign. They were restrained by a law suit, which was finally overturned by the Supreme Court. On September 11, 2014, 54 members of the Senate Democratic caucus voted to approve a bill to begin the legal process for amending the First Amendment that henceforth, "Congress and the states may regulate and set reasonable limits on the raising and spending of money by

Climategate was the name given to the revelations

candidates and others to influence elections.” This bill never progressed, but is now being highlighted by presumptive Democratic presidential candidate Hillary Clinton as one her top priorities within the first 30 days of her administration.

The attacks on ExxonMobil and the various think-tanks over their climate change positions is merely an extension of the movement to suppress any free speech that certain politicians find objectionable. Attempting to restrict the publication of scientific articles demonstrating flaws with global warming and climate change research conducted by leading global warming proponents that came to light in 2009 when the emails of various scientists at the Climate Research Unit at the University of East Anglia were made public. Climategate was the name given to the revelations. Not only did these emails demonstrate the extent of the efforts of these scientists to secretly modify their data to fit their pre-conceived positions, they showed how extensive the conspiracy was to prevent the articles critical of global warming studies from being published in academic journals. So much for the principle of honesty in scientific inquiry.

The letters demanded that the universities provide details about the funding of these seven scientists

This effort to restrict challenges to the religion of climate change was extended into the pillorying of a group of respected climate science researchers by Congressman Raúl Grijalva (D-AZ) in 2015. He sent a letter to a number of universities asking them about seven climate scientists who had, at one-time or another, questioned the climate change hysteria. The letters demanded that the universities provide details about the funding of these seven scientists. They also asked for any communications with anybody about their compensation. This effort was backstopped by three Democratic Senators – Barbara Boxer (CA), Ed Market (MA) and Sheldon Whitehouse (RI) – who fired off letters to 107 different companies, think-tanks, independent organizations, and trade associations, demanding information about anybody in the climate arena to whom they had given funding. The interesting thing is that one of the seven scientists targeted actually acknowledges climate change and supports reductions in carbon emissions. However, he had once challenged the climate change alarmists linking global warming to extreme weather events. The problem was that this challenge was against the position held by John Holdren, President Obama’s science czar, and a leading climate change alarmist.

Energy policy in a Hillary Clinton administration is likely to be a continuation of the Obama policies with a further ramping up of attacks on coal and fossil fuels

While most of us look at the attacks on ExxonMobil and the conservative think-tanks over their climate change positions and what it might mean for energy policy in another Democratic administration, the big question is whether there will be any deviation from the existing administration’s energy policies. Energy policy in a Hillary Clinton administration is likely to be a continuation of the Obama policies with a further ramping up of attacks on coal and fossil fuels. The policies would likely add to the regulatory burden on fossil fuel companies, limiting growth in domestic oil and

The Spanish Inquisition and the McCarthy are two examples of dark periods in history when silencing freedom of thought and association were punished

gas production, and leading to higher energy and utility costs for consumers as more expensive renewable fuels are forced into the power grid. While these are important issues for energy analysts and investors, we believe people should become more sensitive to what we believe is the bigger problem from the growing attack on free speech. Free speech is what made America the country it is, and a country very different from many leading countries around the world. The Spanish Inquisition and the McCarthy are two examples of dark periods in history when silencing freedom of thought and association were punished. History is replete with periods of repression of personal freedoms. Society has never been advanced by these efforts to control the populace's thoughts and actions, and we worry that the current attacks on climate "skepticism" are just another example of actions that will retard scientific investigation and hold back progress to the detriment of our population.

How The LED Lightbulb Is Changing Energy And Business

The theme of the article was how technology was struggling to deal with the need for product obsolescence in order to boost economic activity

A fascinating article in *The New Yorker* magazine about light bulbs got us thinking about how technology works in the energy business and what its impact may be on economies. The theme of the article was how technology was struggling to deal with the need for product obsolescence in order to boost economic activity. The model the author seized upon was the mundane light bulb industry, which is now confronting this question as new lightbulb technology was revolutionizing the industry and forcing manufacturers to attempt to develop a new business model. How, you wonder, could technology not create its own market demand through creating a new model that would replace the old, inefficient product? The challenge is when you create a significantly better product that doesn't need to be replaced as often in the future, thereby reducing market demand and boosting new model prices that choke off consumer purchases.

This particular light bulb has been burning continuously at the Livermore fire department for the past hundred and fifteen years!

The article began with an interview of Tom Bramell, a retired deputy fire chief with the Livermore, California, fire department, discussing the incandescent light bulb that is illuminating the fire department's garage. The interview focused on how the light bulb will be treated when it burns out, a common occurrence. Mr. Bramell said that this light bulb will not "burn out" but rather it will "expire." When that happens, the bulb will not be "thrown out" but rather it will be "laid to rest." Why such elevated language about a lowly light bulb? The answer is because this particular light bulb has been burning continuously at the Livermore fire department for the past hundred and fifteen years! In 2015, after having burned continuously since 1901, the bulb surpassed a million hours in service, making it, according to Guinness World Records, the longest-burning light bulb in the history of the world.

According to Mr. Bramell, the notoriety of this light bulb prompted fans some years ago to install a webcam to monitor it. So far, the

What is known about the Livermore bulb is that it has a carbon filament of about the same human-hair thickness as those, typically made of tungsten, found in modern light bulbs

light bulb has outlived three webcams. The light bulb was manufactured sometime around 1900 by Shelby Electric, of Ohio, using a design by the French-American inventor Adolphe Chaillet. The manufacturer was subsequently purchased by General Electric (GE-NYSE) somewhere around 1912.

People are curious about what makes up the light bulb. That is impossible to do because the light is always on. Other Shelby light bulbs of the same vintage have been studied, but the company reportedly was experimenting with a variety of designs at the time this bulb was made. What is known about the Livermore bulb is that it has a carbon filament of about the same human-hair thickness as those, typically made of tungsten, found in modern light bulbs. The light bulb was made to be a sixty-watt bulb. However, as age does with many things, the light bulb currently illuminates the Livermore Fire Department Station 6 garage with only about the brightness of a typical nightlight.

Incandescent light bulbs commonly burn for about a thousand hours, or approximately half as long as the average incandescent bulb did in the early 1920s

Using the light bulb as segue into the business model discussion, the author pointed out that the Livermore light was an incandescent bulb; those that consumers revile for their short life-span. According to the author, had you switched on such an incandescent light bulb on January 1st of this year and left it on full time, it would likely have died by around February 12th, some 43 days. Incandescent light bulbs commonly burn for about a thousand hours, or approximately half as long as the average incandescent bulb did in the early 1920s. That fact struck us as astounding. As they say, they don't build them like they used to! One wonders whether the incandescent light bulb would have been pushed aside quite as quickly had their life-span continued to be twice what it is now.

Phoebus began work developing standards for brightness and greater energy efficiency for light bulbs

The path to planned obsolescence for incandescent light bulbs evolved when the leading light bulb manufacturers at that time – Philips, Osram and General Electric – met in Switzerland in 2014 and formed Phoebus, an industry association that became the first cartel with a global reach. Phoebus began work on developing new standards for brightness and improved energy efficiency for light bulbs, which had as its initial result a shortening of bulb life-spans.

Longer-lived bulbs were a business model issue, which shorter life spans were meant to solve

The problem the Phoebus standards actually resolved under the guise of improving the bulbs was creating the mass market for light bulbs. Manufacturers needed the increased volumes in order to reduce prices and encourage consumers to use even more bulbs in their homes. Longer-lived bulbs were a business model issue, which shorter life spans were meant to solve. As the article's author put it, "Building bulbs to last poses a vexing problem: no one seems to have a sound business model for such a product." Our economy operates on the concept of planned product obsolescence, which is what keeps our manufacturing plants busy. Almost every product has one or more models with very long lives, but they come at substantially higher costs. Given people's fascination with having

There are some LEDs that promise 50,000 hours of design life

the latest bells and whistles on their products, there is an emphasis on buying products that provide optimal service for a reasonable period of time, with full knowledge that they will then be replaced with a more modern version.

When it comes to light bulbs, the light-emitting-diode light bulb (LED) is the latest product to challenge the planned obsolescence model. LEDs use semiconductor technology to achieve long life spans. There are some LEDs that promise 50,000 hours of design life. The current penetration of LED bulbs within the consumer-lamp market is 7% worldwide. Analysts expect that this penetration rate will climb to 50% by 2022. In the first quarter of 2016, according to the National Electrical Manufacturers Association, LED bulb shipments in the U.S. were up 375% over last year, taking more than a quarter of the light bulb market for the first time in history.

Under more normal usage—each of the sixty-seven bulbs in a typical American household is turned on for an average of only 1.6 hours daily—the LED bulb would, in theory, stay bright for more than 42 years

Although reports suggest that LED technology was first experimented with in the 1930s, the bulbs assumed a prominent place in the 1990s' light bulb array when they surpassed the efficiency of comparably bright incandescent light bulbs. Their appeal was that they consumed less electricity to generate that brightness plus they produced less heat. Today's LED bulbs are advertised with a 25,000-hour design life, which is roughly half the life span they can actually achieve. The shorter life span just happens to match the benchmark for federal Energy Star labelling, suggesting that they should be the preferred product for consumers. Once LEDs surpass the benchmark life-span they will have lost more than 30% of their brightness. Switch on an LED bulb on January 1st and it will likely fail by about May 15th of the following year, or about 500 days. Under more normal usage—each of the sixty-seven bulbs in a typical American household is turned on for an average of only 1.6 hours daily—the LED bulb would, in theory, stay bright for more than 42 years. Therein lies the problem for light bulb manufacturers. In addition, incentives for the purchase of LEDs are now offered in 48 states, and the Department of Energy considers the widespread adoption of this technology to offer the greatest potential impact for energy conservation in the U.S. In other words, the government is working to hurt the planned obsolescence driver.

From the energy market perspective, the amount of electricity consumed is reduced through the use of LEDs rather than incandescent bulbs

We will begin to track the life span of the LED bulbs we use at home to see if their lives have become shorter. From the energy market perspective, the amount of electricity consumed is reduced through the use of LEDs rather than incandescent bulbs. Shortening the life span of LEDs will not impact energy consumed. It will impact the amount of energy needed to produce the bulbs that would have to be replaced more frequently. It is instructive to think about the issue of how planned obsolescence impacts other products and markets. Remember when we were urged to go shopping after the 2008 financial crisis and recession? Longer lived products don't help that strategy.

Has First Shot In New England Natural Gas War Been Fired?

In recent years in order to meet this demand issue, several new and expanded pipeline projects designed to bring greater volumes of natural gas to New England were proposed, but every project has been fought by environmentalists

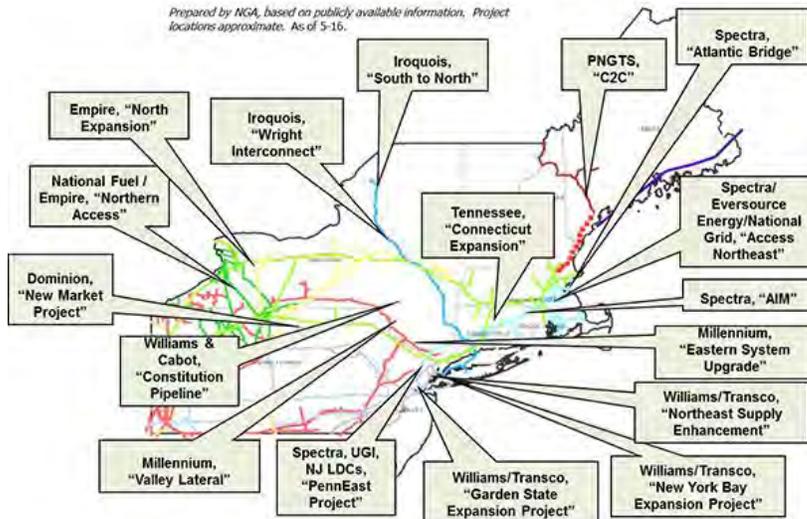
The New England region of the nation has the highest energy costs largely because it lacks sufficient natural gas pipeline capacity to enable utilities to secure greater gas volumes during winter's high demand months. As we have written about numerous times, utilities in the region are often forced to employ high cost and less environmentally-friendly power plants to meet winter power demand. Utilities are often forced to restart mothballed coal-fired and oil-powered electricity generating plants during the winter due to a lack of adequate natural gas supply. In recent years, in order to meet this demand issue, several new and expanded pipeline projects designed to bring greater volumes of natural gas to New England were proposed, but every project has been fought by environmentalists. The battles are being waged over the environmental damage natural gas will cause the region due to air pollution caused by burning this fossil fuel as compared to building and consuming the output from new renewable fuel-powered generating plants. There is also the argument made by the environmentalists that the natural gas is produced through the use of hydraulic fracturing that causes health issues for neighbors.

The Conservation Law Foundation, an environmental organization, filed a lawsuit in Massachusetts over a similar pipeline decision

A recent decision by the Maine Public Utilities Commission (MPUC) may mark the first shot fired back in this war against natural gas. The MPUC approved a plan, over the recommendation of its staff and the objections of environmentalists, to require utility ratepayers in the state to help pay for expanded natural gas access as long as other New England states follow suit. This means that the battle now shifts to the states of Massachusetts, Connecticut, New Hampshire and Rhode Island. The Conservation Law Foundation, an environmental organization, filed a lawsuit in Massachusetts over a similar pipeline decision. They are determined that this proposal "dies on the vine." In Rhode Island, a possible political split is emerging as the state's governor continues to back the construction of a new 900-megawatt gas-powered electricity generation plant in Burrillville. That project depends on the expansion of Spectra Energy Partners' (SEP-NYSE) subsidiary Algonquin's New England pipeline. Politically, Rhode Island's federal legislators, several of whom initially supported the power plant, are now fighting any increased natural gas supply because they favor more expensive renewable fuels. These federal Rhode Island politicians are leading the charge to demonize the fossil fuel industries, its companies and supporters. The Algonquin pipeline expansion will also result in an increase in the volume of natural gas that will ultimately reach Massachusetts consumers.

The Maine Legislature directed the public utility commissioners to determine whether it made sense for ratepayers to shoulder up to \$75 million a year to buy natural gas in a long-term effort to improve the energy supplies to the state. The three commissioners, appointed by Maine Governor Paul LePage (Rep), voted

Exhibit 2. Efforts To Increase Gas Supplies To New England Proposed Pipeline Projects



Source: Northeast Gas Association

The MPUC staff says there are enough new pipeline capacity expansions underway to fill this gap

unanimously to approve the plan despite the objections of their staff and environmentalists. The commissioners perceive cheap natural gas to be a benefit that Maine’s citizens cannot take advantage of because of the blocking of pipeline expansions in the region by environmentalists. The MPUC staff says there are enough new pipeline capacity expansions underway to fill this gap, but clearly the commissioners aren’t in agreement. It is hard to conceive that there won’t be a battle throughout the region over natural gas.

A region that could consume more of the natural gas surplus currently existing in the nation - especially the volumes coming from the neighboring Marcellus and Utica basins in Pennsylvania, Ohio and West Virginia - would certainly help the overall gas market. This battle is just beginning and as the economic argument is advanced, we believe citizens are likely to become more, rather than less, supportive of additional gas pipeline capacity.

Sick Economies Growing Sicker Won’t Help Oil Prices

However, both the 2016 and 2017 forecasts have been reduced by 0.1% from the IMF’s April projections.

Once again the International Monetary Fund (IMF) has lowered its global growth forecasts for 2016 and 2017. Currently, the IMF expects world growth in 2016 to be 3.1%, matching the rate achieved in 2015. It expects growth to ramp up to 3.4% in 2017. That outlook appears positive. However, both the 2016 and 2017 forecasts have been reduced by 0.1% from the IMF’s April projections. The primary reason given for the lowered forecasts was the uncertainty caused by the UK vote for a Brexit from the European Union. When we examine the breakdown of the various

Europe, Japan and the UK are all projected to post lower growth in 2017 than this year, although Canada's economic growth is projected to soar by 50%, from 1.4% in 2016 to 2.1% in 2017

regional and country growth estimates, we note a wide difference in outlooks. For example, the IMF projects the U.S. economy growing by 0.3 percentage points between 2016 and 2017. This comes despite the fact that the entire Advanced Economies group, including the U.S., is projected to show no growth between 2016 and 2017. Europe, Japan and the UK are all projected to post lower growth in 2017 than this year, although Canada's economic growth is projected to soar by 50%, from 1.4% in 2016 to 2.1% in 2017.

Exhibit 3. IMF's Latest Global Economic Growth Forecast

Latest growth projections

Another wave of uncertainty could weaken global recovery further.
(GDP, percent change)

	2015	Projections		Difference from April 2016 WEO Projections 1/	
		2016	2017	2016	2017
World Output	3.1	3.1	3.4	-0.1	-0.1
Advanced Economies	1.9	1.8	1.8	-0.1	-0.2
United States	2.4	2.2	2.5	-0.2	0.0
Euro Area	1.7	1.6	1.4	0.1	-0.2
Germany	1.5	1.6	1.2	0.1	-0.4
France	1.3	1.5	1.2	0.4	-0.1
Italy	0.8	0.9	1.0	-0.1	-0.1
Spain	3.2	2.6	2.1	0.0	-0.2
Japan	0.5	0.3	0.1	-0.2	0.2
United Kingdom	2.2	1.7	1.3	-0.2	-0.9
Canada	1.1	1.4	2.1	-0.1	0.2
Other Advanced Economies 2/	2.0	2.0	2.3	-0.1	-0.1
Emerging Market and Developing Economies	4.0	4.1	4.6	0.0	0.0
Commonwealth of Independent States	-2.8	-0.6	1.5	0.5	0.2
Russia	-3.7	-1.2	1.0	0.6	0.2
Excluding Russia	-0.6	1.0	2.5	0.1	0.2
Emerging and Developing Asia	6.6	6.4	6.3	0.0	0.0
China	6.9	6.6	6.2	0.1	0.0
India 3/	7.6	7.4	7.4	-0.1	-0.1
ASEAN-5 4/	4.8	4.8	5.1	0.0	0.0
Emerging and Developing Europe	3.6	3.5	3.2	0.0	-0.1
Latin America and the Caribbean	0.0	-0.4	1.6	0.1	0.1
Brazil	-3.8	-3.3	0.5	0.5	0.5
Mexico	2.5	2.5	2.6	0.1	0.0
Middle East, North Africa, Afghanistan, and Pakistan	2.3	3.4	3.3	0.3	-0.2
Saudi Arabia	3.5	1.2	2.0	0.0	0.1
Sub-Saharan Africa	3.3	1.6	3.3	-1.4	-0.7
Nigeria	2.7	-1.8	1.1	-4.1	-2.4
South Africa	1.3	0.1	1.0	-0.5	-0.2
Low-Income Developing Countries	4.5	3.8	5.1	-0.9	-0.4

Source: IMF, *World Economic Outlook Update*, July 2016.

Note: Real effective exchange rates are assumed to remain constant at the levels prevailing during June 24–June 28, 2016. Economies are listed on the basis of economic size. The aggregated quarterly data are seasonally adjusted.

1/ Difference based on rounded figures for both the current and April 2016 World Economic Outlook forecasts.

2/ Excludes the G7 (Canada, France, Germany, Italy, Japan, United Kingdom, United States) and euro area countries.

3/ For India, data and forecasts are presented on a fiscal year basis and GDP from 2011 onward is based on GDP at market prices with FY2011/12 as a base year.

4/ Indonesia, Malaysia, Philippines, Thailand, Vietnam.

Source: IMF

We found it interesting that both China and India are forecasted to generate either flat or lower growth in 2017 compared to 2016

When we examine the growth forecasts for countries important for energy demand, Russia is projected to show a sharp recovery from a recession (-1.2%) in 2016 to 1.0% growth in 2017. Both Nigeria and Brazil are projected to post recoveries in 2017 after recessions experienced this year. We found it interesting that both China and India are forecasted to generate either flat or lower growth in 2017 compared to 2016. In the case of China, the IMF reports that

For China, the oil demand growth in 2016 and 2017 is projected at 0.3 mmb/d

the country posted 6.9% growth in 2015 but will only achieve 6.6% growth in 2016 and an even lower 6.2% growth in 2017. For India, 2017's growth of 7.4% will match the growth projected for 2016, but down from the 7.6% achieved in 2015.

For forecasting energy markets, we find that China's economic outlook presents a challenge. Based on data and media reports, China is nearing the end of its latest crude oil strategic storage inventory build. At the same time, China has been exporting substantial volumes of diesel oil refined in the country to other Asian markets, potentially distorting domestic demand figures. Meanwhile, China's automobile industry continues growing, which should boost transportation fuel consumption. A big risk for China is that the government has returned to boosting economic activity by pumping up investment in basic industries and manufacturing. The investment is designed to offset its weak financial sector that has generated fear over state-supported business loan failures. In other words, China has a muddy economic outlook, which is the government's goal of preventing an accurate assessment of the country's economic health. The International Energy Agency (IEA) in its June 2016 monthly oil report suggests that world oil demand will grow by 0.1 million barrels per day (mmb/d) in 2016 from its May forecast, but it sees demand lower by 0.1 mmb/d in 2017. For China, the oil demand growth in 2016 and 2017 is projected at 0.3 mmb/d. The 2016 and 2017 demand growth forecasts, however, are down substantially from the 0.7 mmb/d growth experienced in 2015.

The themes were the new uncertainty created by the Brexit vote and the economic adjustments underway in China

The challenges facing the world's economies and policymakers were summed up in a graphic in the IMF's presentation of this revised economic forecast. The themes were the new uncertainty created by the Brexit vote and the economic adjustments underway in China along with other considerations such as the refugee crisis, political uncertainty, climate-related factors and terrorism. The IMF acknowledges there is no one economic strategy that will work for every country, but action is needed.

Exhibit 4. IMF Uncertainty Factors In Its Economic Forecast



Source: IMF

Considering the recently revised global growth forecast and all these other factors, it is difficult to anticipate much in the way of positive news that would support meaningfully higher oil prices

It will be interesting to see where the IMF forecasts are when they are revised in the fall. A number of key political elections will have been held by then, some of them in Africa. But then the upcoming U.S. election will be on everyone's radar screen. Will it be clear then who will win the U.S. presidency, or will it be a close election that won't be decided until the votes are counted in early November? At the same time, an increase in terrorism in the interim could produce much greater economic and political chaos that will likely knock down projected future economic growth rates. Considering the recently revised global growth forecast and all these other factors, it is difficult to anticipate much in the way of positive news that would support meaningfully higher oil prices. Even though energy companies are feeling better about the worst of the downturn being behind the industry, a judgement we concur with, the question for us hasn't been when the cycle's bottom is reached but rather what will be the shape of the industry recovery. Could the energy recovery be weak, mirroring the pace of the recovery experienced by the global economy since the 2008 crisis and recession, or will it be more robust?

How U.S. LNG Is Changing The Natural Gas Energy Map

It appears the Middle East is becoming a primary LNG export market for cheap U.S. natural gas, a scenario we haven't found presented earlier by forecasters

When the first U.S. liquefied natural gas (LNG) exports were contemplated, the target was the high-priced market in Asia. At that time, Japan and South Korea, the leading importers of LNG, paid prices in the \$17-\$20 per thousand cubic feet of gas as import prices were set by long-term contracts tying LNG prices to indices of world oil prices. These very high natural gas prices were a direct result of the high oil prices the world was experiencing in the early years of this century coupled with the need for long-term contracts for LNG supply that produced healthy profit margins for suppliers. With the era of low oil prices, the LNG market has changed and those high-priced contract prices have been cut in half. After Asia, strategists believed that Europe, which is heavily dependent on Russian natural gas supplies and which had been used as a political weapon against the continent's countries, might provide opportunities for U.S. LNG. South America was also considered a target market due to the large populations of certain countries and their energy needs. The close proximity of South American countries to the U.S. Gulf Coast LNG export terminals was also considered a possible driver for opening up this market. Now, however, it appears the Middle East is becoming a primary LNG export market for cheap U.S. natural gas, a scenario we haven't found presented earlier by forecasters.

Cheniere has sent cargos to seven countries, including Argentina, Chile, Brazil, India, Portugal, Dubai and Kuwait

In recent months, two LNG cargoes from Cheniere Energy's (LNG-NYSE) Sabine Pass export terminal in Louisiana have been delivered to Kuwait and Dubai. So far, since it began shipping LNG in February, Cheniere has sent cargos to seven countries, including Argentina, Chile, Brazil, India, Portugal, Dubai and Kuwait. The shipments to the Middle East reflect the soaring demand for energy in these countries. (As a testament to the nation's energy demand

As all the countries in the Middle East have rapidly growing populations, their domestic demand is growing and tends to soar during the hot summer months

issue, Saudi Arabia recently disclosed it has been drawing on its domestic oil inventories to meet the summer energy demand surge and to avoid having to further boost oil production above the country's current 10.5 million barrels a day rate.) As all the countries in the Middle East have rapidly growing populations, their domestic demand is growing and tends to soar during the hot summer months. Most of these countries have large natural gas resources, but other than Qatar, which is currently the world's largest LNG exporter, they are less developed. We expect the rest of the countries in the region will step up the pace of their natural gas resource development.

By using more domestic natural gas, Saudi Arabia will be able to reduce the volume of crude oil it burns to power these facilities

In order to appreciate the market potential for cheap U.S. natural gas, Kuwait's LNG imports exploded from one million tons in 2012 to 3.04 million tons last year, according to the *Middle East Economic Survey*. We know that Saudi Arabia has been ramping up its drilling for natural gas in order to power more of the country's water desalination plants and electricity generators. By using more domestic natural gas, Saudi Arabia will be able to reduce the volume of crude oil burned to power these facilities. That will enable Saudi Arabia to have more of its crude oil output available for export and to generate income for the government, rather than burning it under utility boilers. For the meantime, we expect more U.S. LNG cargos will find their way to the Middle East. Those LNG exports will help to tighten the domestic gas market and send natural gas prices higher as we move into 2017, but we are not sure that the Middle East will become a long-term U.S. LNG export market. But the industry will take whatever demand it can find it now.

U.S. Auto Mileage Standard Will Not Be Achieved By 2025

If current trends continue, the U.S. fleet would only reach 50.5 mpg on average by 2025, almost 10% below the current target

The Obama Administration has begun a review of its average fuel efficiency targets for automobile and light-duty truck fleets. The current standard has a target for the industry of 54.5 miles per gallon (mpg) on average by 2025. In the first survey, the research noted the impact on current fuel efficiency achievements from low gasoline prices, which have spurred purchases of sport-utility vehicles and pickup trucks. These vehicles tend to have lower fuel-efficiency ratings that pull the overall fleet average down and may prevent the auto companies from meeting the current standards. The report concluded that if current trends continue, the U.S. fleet would only reach 50.5 mpg on average by 2025, almost 10% below the current target.

Given the challenge with SUVs and pickups and low gasoline prices, the auto manufacturers are pushing the government to back off from the current standards. Because the average fleet standard is measured on the basis of the vehicles the auto companies sell and not those that they build, low fuel prices can have a much greater impact on company fleet fuel efficiency averages than the managements can anticipate in planning their output array. As a

Higher fines mean that either vehicle prices must be increased or company profits shrink

result, a representative of the Auto Alliance, a group of 12 large auto manufacturers, said that the initial report showed that the government was acknowledging the challenge these companies are dealing with. Gloria Bergquist, the vice president for public affairs of Auto Alliance, said, "The government is acknowledging the effect of factors like low gas prices on consumer sales, and the impact of consumer sales on the targets." While this position may be true, government officials have also suggested that they will contemplate increasing the existing fines for missing the fuel-efficiency targets as currently embedded in the regulations. We have previously suggested that this prospect would become a problem for auto manufacturers. Higher fines mean that either vehicle prices must be increased or company profits shrink. Neither option is acceptable for auto manufacturers. If fines are sufficiently high, we could have a condition where auto manufacturers need to allocate their production of SUVs and pickups, which means consumers will pay higher prices or not be able to buy the vehicles they want. On the other hand, car dealers might offer amazing incentives for their most fuel-efficient vehicle offerings, including electric cars and hybrid vehicles, which are accorded special status in the calculation of fleet-wide averages. More sales of these vehicles will help overall fleet fuel-efficiency ratings. The best option for the auto companies might be a change in political parties controlling the White House.

The Challenge To Science Involving Climate Change Movement

We recently learned of the collapse of several academic studies hailed at the time they were published as demonstrating the inherent risk of pollution from fossil fuel operations

"A lie can travel half way around the world while the truth is putting on its shoes" is a quote attributed to American writer Mark Twain. While we don't believe he was referring to climate studies, based on recent events, one has to acknowledge the truth in the quotation. We recently learned of the collapse of several academic studies hailed at the time they were published as demonstrating the inherent risk of pollution from fossil fuel operations. When released, the studies were highlighted for the unrecognized dangers they were pointing out. The most high-profile study dealt with the air pollution impact on people living near natural gas drilling operations where hydraulic fracturing was being conducted. The thrust of the article was that "fracking" was dangerous and should be stopped. It ignored the benefits associated with fracking such as unlocking greater natural gas and crude oil resources that have contributed to the current abnormally low commodity prices, which in turn have helped increase economic activity. The low commodity prices, especially for natural gas, undercut the economics of operating power plants fueled by "dirty coal," the environmental objective of the Barack Obama presidency. The problem was that coal-fired plants were being replaced by natural gas-fired power plants rather than renewable fuel plants. Therefore, the academic effort was directed at figuring out how to shut down natural gas drilling.

At the time the study was released in mid-May 2015, *Newsweek* published an article with the headline: "FRACKING COULD

This was obviously seen as bad news for the energy industry that had been promoting the science showing that fracking was a safe

INCREASE RISK OF CANCER, NEW STUDY FINDS.” The article’s tag line was: “Hydraulic fracturing releases chemicals responsible for cancer and respiratory diseases.” This was obviously seen as bad news for the energy industry that had been promoting the science showing that fracking was a safe, efficient and beneficial activity that would lead to long-term benefits for the nation’s residents struggling to have cleaner and lower cost energy supplies.

According to the *Newsweek* article:

“Living near to active fracking sites could increase the risk of cancer as the process harmful chemicals into the air, a new study has found.

“Researchers from Oregon State University (OSU) and the University of Cincinnati found that hydraulic fracturing, commonly known as fracking, releases polycyclic aromatic hydrocarbons (PAHs), which are linked to cancers and respiratory diseases.

“The study found that moving just one mile away from active sites reduced the levels of the dangerous chemicals in the air by up to 30%.”

According to *Retraction Watch*, the study has been retracted - not corrected or revised, but fully retracted

According to *Retraction Watch*, the study has been retracted - not corrected or revised, but fully retracted. The reason given for the retraction was a “spreadsheet error” that resulted in completely incorrect findings. When originally published in the journal *Environmental Science & Technology*, the paper claimed that pollution levels in areas where fracking operations were being undertaken exceeded limits set by the U.S. Environmental Protection Agency (EPA) for lifetime cancer risk. In fact, in a press release accompanying the publication of the article, co-author Kim Anderson, an environmental chemist at OSU, said: “Air pollution from fracking operations may pose an under-recognized health hazard to people living near them.” The corrected data now sets that risk below the EPA’s levels.

On the same day this natural gas study was retracted, June 29th, a second paper by the same authors...was retracted

On the same day this natural gas study was retracted, June 29th, a second paper by the same authors about the increased level of air contamination caused by 2010’s Deepwater Horizon oil spill in the Gulf of Mexico was retracted due to errors in its analysis. We have yet to see any mention in the mainstream media of either of these retractions, but we are not surprised.

The hyping of scientific studies based on flawed research that supports popular views is a disservice to the debate over the causes of climate change and its potential dangers. Then again that is not the primary goal of some of this research. It certainly not the reporting of the conclusions by the mainstream media. At the same time we learned of the retraction of these two important climate studies, we were treated to a discussion about the questioning of the

Dr. Muller has been a controversial player in the science surrounding climate change

His “conversion” was hailed by the environmental community as a signal that a skeptical scientist had been convinced so there was clearly no role in the future debate over climate change for skeptics

degrees of climate change belief and why there is no room for skepticism.

Richard A. Muller, a noted professor of physics at the University of California, Berkley and a faculty senior scientist at the Lawrence Berkeley National Laboratory, offered a schematic of the range of thoughts about climate change in his book [Energy for Future Presidents](#). Dr. Muller has been a controversial player in the science surrounding climate change. He was a critic of the Michael Mann, et al study on global warming that produced the “hockey stick” historical temperature reconstruction. That study played a major role in early UN Intergovernmental Panel on Climate Change reports about the dangers of uncontrolled carbon emissions and the rapid increases in average global temperatures this will cause.

Dr. Muller and his daughter, also a professor at UC, Berkley, authored a paper claiming that the decline in U.S. tornado activity since the 1950s was due to global warming. The paper was criticized by tornado experts for its flawed mathematical analysis. More recently, Dr. Muller testified before Congress where he said that humans were the primary cause for the recent global warming but that the rise was manageable. His “conversion” was hailed by the environmental community as a signal that a skeptical scientist had been convinced so there was clearly no role in the future debate over climate change for skeptics.

The climate change thought schematic Dr. Muller presented in his book included six categories.

“Alarmists. They pay little attention to the details of the science. They are “unconvincibles.” They say the danger is imminent, so scare tactics are both necessary and appropriate, especially to counter the deniers. They implicitly assume that all global warming and human-caused global warming are identical.

“Exaggerators. They know the science but exaggerate for the public good. They feel the public doesn’t find a 0.64°C change threatening, so they have to cherry-pick and distort a little—for a good cause.

“Warmists. These people stick to the science. They may not know the answer to every complaint of the skeptics, but they have grown to trust the scientists who work on the issues. They are convinced the danger is serious and imminent.

“Lukewarmists. They, too, stick to the science. They recognize there is a danger but feel it is uncertain. We should do something, but it can be measured. We have time.

“Skeptics. They know the science but are bothered by the exaggerators, and they point to serious flaws in the theory and data

analysis. They get annoyed when the warmists ignore their complaints, many of which are valid. This group includes auditors, scientists who carefully check the analysis of others.

“Deniers. They pay little attention to the details of the science. They are “unconvincibles.” They consider the alarmists’ proposals dangerous threats to our economy, so exaggerations are both necessary and appropriate to counter them.”

For them, it is Warmists or Deniers

This topology of climate believers unfortunately provides too many “outs” for the Climatistas. For them, which includes the group of Democratic Senators who took to the floor of the Senate to denounce by name those who “deny” the religion of climate change, there are only two categories, not six. For them, it is Warmists or Deniers. There is no room for the Lukewarmists who recognize the dangers of climate change but believe we do not need to undertake drastic and rash actions that may create greater problems than they solve. The Climatistas also have no problem with those who exaggerate or promote alarmist scenarios.

He also pointed to a *New York Times* article highlighting the conflicting opinions within the climate change fraternity on many energy issues such as the roles of nuclear power and natural gas

The author of the article about Dr. Muller’s categorization of positions on climate change pointed to the Democratic senators’ “stunt” on the floor of the Senate as “a sign of desperation of the extreme climate camp.” He also pointed to a *New York Times* article highlighting the conflicting opinions within the climate change fraternity on many energy issues such as the roles of nuclear power and natural gas (New York State is an interesting case study). We have not read the referenced article, but it supposedly discussed the issue of whether climate change supporters should work with corporations or simply demonize all business over fossil fuel use.

Better make the case now before the data fails to support the argument

We thought the recent announcement by the National Oceanic and Atmospheric Administration (NOAA) release showing that their data demonstrates that the first half of 2016 was the warmest ever was another example of the climate change movement’s desperation. The NOAA officials pointed out that part of the reason for the warming in 2016 was the extreme El Niño experienced in 2015. With its end, water temperatures in the Pacific Ocean are cooling rapidly and global temperatures are likely to be cooler during the second half of 2016. NOAA’s release was unprecedented as it has never issued a mid-year update to its global temperature data. Better make the case now before the data fails to support the argument. Just a further sign of climate change desperation?

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