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## MUSINGS FROM THE OIL PATCH

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

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### Is NOIA About To Focus On Offshore Regulation Overreach?

**Economists are calling this slow growth “secular stagnation”**

Economists have struggled to explain why today’s economy struggles to grow any faster than 2% per year. This period of slow growth contrasts with the economy’s historical record since the end of World War II that has averaged about 3% per year. Economists are calling this slow growth “secular stagnation.” Extensive economic research has been undertaken recently to find the cause of this secular stagnation, but with little success.

**Annual U.S. economic growth would remain in the 2% to 2.25% range**

In its annual start of the year roundtable event of investment professionals, leading financial newspaper *Barron’s* explored the secular stagnation issue. Initially, the all-day panel discussion focused on the state of the U.S. and global economies. Scott Black, founder and president of Delphi Management, said, “To repair the economy, we need structural changes in public policy. From 2009 to 2014, gross domestic product grew by an average of 1.4% a year. The normalized postwar rate is 3%.” He went on to cite various impediments to a return to that historical growth rate, and why, in his estimation, no solutions were forthcoming, which means annual U.S. economic growth would remain in the 2% to 2.25% range.

The most succinct summation of the challenges facing global economies and their outlook was offered by Felix Zulauf, president of Zulauf Asset Management located in Switzerland. He said:

**“It could last for the next 15 or 20 years”**

“Coming back to the question of when secular stagnation ends, it could last for the next 15 or 20 years. It relates in part to demographics. We’ve had three demographic waves propelling the world economy: The baby boomers went to work, Eastern Europe joined the world economy, and China joined the world economy. That’s all over now.

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**“Also, regulation has increased dramatically in the past 15 years, and the trend is toward even more regulation”**

“Another issue is debt. The world economy has levered up since the early 1980s, and economic subjects have hit their borrowing-capacity limits. By definition, that means lower demand. Also, regulation has increased dramatically in the past 15 years, and the trend is toward even more regulation. That is a restraining force on growth. Finally, bad economic policies have focused for decades on demand stimulation. We can’t change demographics. We should restructure debt, reduce regulation, and pursue sounder policies. But none of these issues is being discussed or addressed. That’s why secular stagnation will linger.”

**One of those concerns should be the overbearing offshore regulation by the government**

On that dour outlook, we found it somewhat refreshing to learn that the leading offshore oil and gas and renewables organization, National Ocean Industries Association (NOIA), is considering shifting its orientation from an almost exclusive focus on access to offshore resources to addressing current conditions impacting its members. This means examining what it is that the organization can do to increase its relevance to the concerns of its members. One of those concerns should be the overbearing offshore regulation by the government.

**In recent years, NOIA’s membership has expanded to include companies involved in offshore renewable and alternative energy opportunities**

NOIA was founded in 1972 with 33 members representing all facets of the domestic offshore energy and related industries. At that time, U.S. oil and natural gas production had peaked and the petroleum industry needed greater access to known offshore resources in the Gulf of Mexico. NOIA’s mission has been the safe development of offshore energy. Critical to that mission has been pushing to make sure that the federal government who controls the offshore waters and their resources provides reasonable access for the industry to these resources. In recent years, NOIA’s membership has expanded to include companies involved in offshore renewable and alternative energy opportunities where the nation’s resources are large.

**The industry only has itself to blame for the current state of offshore regulation**

In recent years, and especially in response to the 2010 Macondo well accident and subsequent oil spill, offshore regulation of the oil and gas industry and its service contractors has expanded and become more rigorous and onerous. The expansion of the federal government’s offshore regulatory authority has been done in a manner that limited the ability of the offshore service industry to have input into the drafting of the rules the industry must operate under and the standards it must adhere to. This regulatory expansion has been done outside of the regular process for government agencies to conduct rule-making that has been in place since the late 1940s. This is an issue we have written about and chastised offshore service company executives for not fighting more vigorously when they were able to intervene and force their voices into the dialogue. In fact, the industry only has itself to blame for the current state of offshore regulation. Now, that regulation has taken a momentous turn that, in our view, has significantly elevated the risk for companies operating offshore.

**A federal grand jury indicted two companies on involuntary manslaughter charges and three people face other charges**

The ominous turn of events occurred last November when, as reported by the *Associated Press* in an article carried on the digital web site of the *Times-Picayune*, a federal grand jury indicted two companies on involuntary manslaughter charges and three people face other charges related to the 2012 deadly explosion due to a welding accident on an oil production platform in the Gulf of Mexico owned by Black Elk Energy Offshore Operations LLC. The accident claimed the lives of three workers and injured others.

**The contractor is facing criminal charges for violating offshore safety regulations**

Both Black Elk and its contractor, Grand Isle Shipyards Inc., were charged with three counts of involuntary manslaughter along with eight charges for violating federal safety practices under the Outer Continental Shelf Lands Act (OSCLA) and one violation of the Clean Water Act (CWA). Another contractor, Wood Group PSN Inc., and three workers were charged with violating the OCSLA and the CWA.

**As cited by prominent investors, increased government regulation is a costly drag on U.S. and global economic growth, and it is certainly hurting the oil and gas industry now especially given low commodity prices**

The significance of this development is that along with bringing involuntary manslaughter charges against a contractor for the deaths, the contractor is facing criminal charges for violating offshore safety regulations. We believe this may be the first time criminal charges have been invoked for a violation of offshore regulations. As New Orleans award-winning chef Emeril Lagasse would say - they kicked it up a notch!

As we understand, NOIA is conducting a survey of its executive board members about what issues are most relevant to their companies and what changes NOIA may want to consider. We do not know the full extent of possible mission shifts NOIA is considering, but a failure to address the current overbearing offshore regulation would be a mistake, especially now that the government has demonstrated its willingness to bring criminal charges against companies for violating them. As cited by prominent investors, increased government regulation is a costly drag on U.S. and global economic growth, and it is certainly hurting the oil and gas industry now especially given low commodity prices. The fact that the federal government has felt emboldened to elevate offshore safety rule violations to criminal status has injected a new level of risk for oilfield service companies operating offshore. We would hope NOIA and its members examine closely the growing use by the federal government of regulatory oversight in order to punish companies and managers for rule violations, especially in areas where they are not aware of changes in interpretations of those rules. As offshore service companies and their managers now face potential prison time for violating operating rules as opposed to the leveling of fines and operating procedure changes as in the past, the risk of working offshore has increased dramatically. Has the risk surpassed the returns available? Executives will need to make that decision. What bothers us is how many of them have no knowledge of their newly increased risk.

## For Oil Industry: What Is The Sound Of Another Shoe Dropping?

**For those old enough to have experienced the 1986 oil price collapse, what happened last week was a flashback to early 1986**

Forecasting the path of oil prices requires the powers of many philosophers, Zen masters and a little bit of James Bond. We are quite familiar with the philosophical question: "If a tree falls in a forest and no one is around to hear it, does it make a sound?" As *Wikipedia* explains, this is "a philosophical thought experiment that raises questions regarding observation and knowledge of reality." Reality - that's a great word today as we watch the crude oil market imploding. For those old enough to have experienced the 1986 oil price collapse, what happened last week was a flashback to early 1986. Between January 6 and March 31, 1986, crude oil spot prices fell from \$26.53 to \$10.25 a barrel.

**"What is the sound of one hand clapping?"**

Another philosophical question we ponder is the traditional zen koan: "What is the sound of one hand clapping?" A koan is a question posed by a Zen master to a student and is meant to be pondered from within the routine of daily life until the answer opens the true heart of the question. As *Answers.com* puts it, "All koans must be answered from within the realm of one's own personal experience, and thus be encountered in the journey of living rather than in the rationalizations of logical thought." Logic - another great word to be weighed when considering explaining today's oil market gyrations.

**"Do I look like I give a damn?"**

Last we are left with James Bond – an iconoclast purveyor of martinis. His favorite drink order is a vodka martini that is shaken, not stirred – the wrong alcohol and the wrong mixology. In one scene in the movie *Casino Royale*, Mr. Bond is losing millions of dollars in a game of poker. He is obviously stressed and when asked if he wants his martini shaken or stirred, he barks, "Do I look like I give a damn?" Watching the oil market, one has the same reaction – just give me the alcohol!

**Numerous Wall Street energy analysts are busy revising their recently-revised oil price forecasts, but without any real conviction**

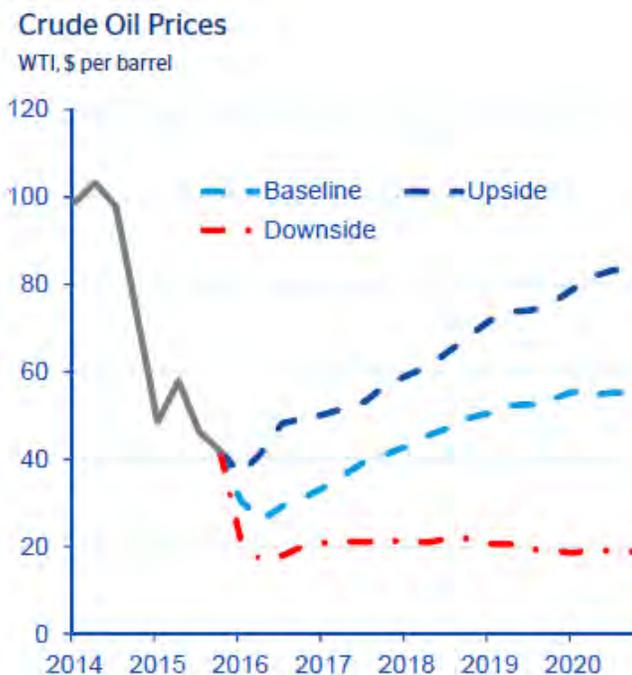
So how do we use reality, logic and martinis to explain the current oil market? The martinis are probably more helpful than either of the words. Dulling our senses makes the pain more tolerable. The going ons in this market defy explanation. We were pondering comments about the health of and possible future direction for oil prices in light of the recent monthly publications of the International Energy Agency and the Organization of Petroleum Exporting Countries who offered sober outlooks. Numerous Wall Street energy analysts are busy revising their recently-revised oil price forecasts, but without any real conviction. And then there are the outlooks presented by two Texas-based economists who recently spoke at the MIT Enterprise Forum of Texas' annual business outlook lunch.

In her presentation on the local economy, Kim Chase, Senior Economist with BBVA Research, part of BBVA Compass Bancshares, Inc., a unit of the BBVA Group (BBVA-NYSE),

**She described the market as characterized by the current oil oversupply, weaker than anticipated demand and the large overhang of oil inventories**

presented a forecast for WTI oil prices for 2016-2020. Her baseline case was bracketed with upside and downside cases. Ms. Chase's slide had language to the effect that market conditions support a low oil price environment – no kidding! She described the market as characterized by the current oil oversupply, weaker than anticipated demand and the large overhang of oil inventories. When Ms. Chase's slide first appeared on the screen, she immediately cautioned the audience not to react too violently to her 2016 baseline oil price number. Her number was viewed in the context of WTI futures prices trading that day between a low of \$31.70 a barrel to \$32.67 at the high. The futures price had opened trading that morning at \$31.60, so optimism was in the minds of the audience. Of course, the MIT Forum was being held at the same time several Wall Street investment banks were offering their opinions that oil prices would have to fall to \$20 a barrel, or possibly lower, in order to force operators to stop drilling, allowing production to fall and rebalance the oil market, leading eventually to higher oil prices.

**Exhibit 1. A Wide Range Of Oil Price Forecasts**



Source: BBVA Research

Source: **BBVA Research**

**We were more intrigued with her downside forecast projecting a \$19 a barrel average price**

While most of the audience was interested in Ms. Chase's 2016 baseline oil price forecast, we were more intrigued with her downside forecast projecting a \$19 a barrel average price. Given that oil was trading in the low \$30s a barrel during the first two weeks of 2016, reaching a \$19 average suggested a sharply lower price for a period of time and then only a modest price rebound as

**Oil prices in that case peak at \$21.50 a barrel in 2018 but then steadily decline until they are below \$19 a barrel in 2020**

the year goes on. That scenario, we expect, would break the domestic industry, hurting the employment prospects from thousands and inflict significant economic harm on Houston.

Other interesting data points in her forecast were oil prices in the out-years, especially in the downside case. As shown in Exhibit 2, oil prices in that case peak at \$21.50 a barrel in 2018 but then steadily decline until they are below \$19 a barrel in 2020. Unfortunately, Ms. Chase did not discuss her thinking about the prices in the out-years, so we don't know what set of events gets the industry potentially to a price in 2020 that is lower than in 2016. Our guess is that we would have a dismal economic backdrop and/or serious oil market share loss, most likely to increased efficiency, increased renewable fuels and/or low cost international oil producers.

**Exhibit 2. Scary Downside Oil Price Forecast**

**Crude Oil Prices Forecasts**

WTI, \$ per barrel, annual average

	Baseline	Upside	Downside
2015	48.6	48.6	48.6
2016	29.2	43.9	19.0
2017	37.6	53.0	21.0
2018	46.2	63.3	21.5
2019	52.3	73.8	19.9
2020	55.1	81.9	18.8

Source: BBVA Research

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Source: **BBVA Research**

**Doug Terreson, the oil analyst with Wall Street broker Evercore ISI, recently slashed his 2016 oil price forecast to \$35 from his prior estimate of \$65**

Ms. Chase's forecast is not the only low case we have seen in recent days. Oil price prognosticators are being forced to reconcile current low oil prices against their late-2015 forecasts, which did not expect prices to drop as much as they have. Doug Terreson, the oil analyst with Wall Street broker Evercore ISI, recently slashed his 2016 oil price forecast to \$35 from his prior estimate of \$65. The cut is predicated on slowing demand growth and increased supply. He pointed to two months of negative revisions to demand growth estimates plus the recent downward revision to global GDP growth projections by the International Monetary Fund to support his view. In addition, several countries have recently reduced fuel subsidies, sharply increasing the cost to operate vehicles in these countries

**Continuing to produce, even at low oil prices, adds to a company's cash flow, which may be important in keeping the lights on**

that will impact petroleum demand. On the supply side, Mr. Terreson sees the increased tension between Saudi Arabia and Iran signifying an inability of OPEC to co-ordinate a reduction in the organization's output. Furthermore, Saudi Arabian officials have said they will increase their output if world oil demand increases.

We continue to hear from consultants, oil industry executives and energy investors how the industry does not work at these very low oil prices. We understand all the analyses conducted showing how virtually every oil field and oil producer is losing money at current oil prices (high \$20s to low \$30s a barrel), but they continue to produce. Part of the reason they do is because they are worried about the long-term health of the reservoirs, noting that in the past, shutting down wells hurt their output when production resumed. That lost output can produce long-term damage to the health of companies. Continuing to produce, even at low oil prices, adds to a company's cash flow, which may be important in keeping the lights on. As one small, private exploration and production company executive put it, he was happy that his company only had a small amount of production (that meant they had not drilled expensive wells during a period of falling oil prices), but on the other hand he was sad they only had a small amount of production as he could have used the extra cash flow to survive.

**Reducing costs to stay within cash flow means laying-off employees**

With oil prices dropping and E&P companies cutting their spending, the answer to our question of what is the sound of another shoe dropping is becoming clear. It is the sound of pink slips landing on employees' desks. Living within one's cash flow has taken on greater meaning for companies today. Unfortunately, the major operating costs are employees, especially when there isn't much to do. Reducing costs to stay within cash flow means laying-off employees. Last Thursday afternoon, Houston and the oil patch were shocked by Southwestern Energy's (SWN-NYSE) announcement that it was terminating 1,100 employees, or 44% of its labor force, as it deals with low oil and gas prices. The third largest natural gas producer indicated it had no drilling rigs operating and was reducing its capital spending plans for the year.

**Since the third quarter of 2014, Schlumberger has cut 34,000 employees, representing 26% of its workforce**

The next day, leading oilfield service provider Schlumberger Ltd. (SLB-NYSE) announced plans to reduce its workforce by 10,000 in response to low commodity prices and low oilfield activity. Since the third quarter of 2014, Schlumberger has cut 34,000 employees, representing 26% of its workforce. The company also stated in its fourth quarter earnings release that it doesn't see an increase in oilfield activity until 2017. This view is rapidly being embraced by the industry and shaping all staffing and capital spending decisions.

Leading forecasting groups – the International Energy Agency, OPEC, IHS, Wood Mackenzie – are embracing the view that the current low oil prices will force the industry to further cut its activity during the first half of 2016 and that natural attrition in production will

**A balanced market will allow bloated global petroleum inventories to start shrinking, which sets the stage for higher oil prices in the third and fourth quarters of 2016 and still higher prices in 2017**

drop global oil supplies, despite the addition of possibly 300,000-500,000 barrels a day of oil exports from Iran this year. These groups also see demand continuing to grow, although uncertainty about the health of the Chinese economy is becoming a significant wildcard in the forecasts. On balance, these forecasters see the imbalance of global oil supply and demand, which has existed for the past two years, will return to a more balanced condition by the second half of 2016. A balanced market will allow bloated global petroleum inventories to start shrinking, which sets the stage for higher oil prices in the third and fourth quarters of 2016 and still higher prices in 2017. It will be the combination of continued oil demand growth, matched by a stable supply outlook and declining inventories, that drives an upturn in oilfield activity in the first half of 2017. The challenge for the energy industry will be getting back those employees receiving pink slips now.

## **Record Auto Sales And Optimism Trumped At Auto Show**

**The show debuted far fewer concept cars and future production models than in prior years**

The recent North American International Auto Show in Detroit highlighted new vehicles from auto manufacturers, but the show debuted far fewer concept cars and future production models than in prior years. The show was also marked by the absence of a handful of prominent car manufacturers including Maserati, Rolls Royce, Tesla (TSLA-Nasdaq), Jaguar and Land Rover. One new model that was showcased at the show was a hydrogen cell-powered Mercedes GLC expected to be in showrooms in 2017.

**The attention given to electric vehicles at the show was somewhat surprising**

What did seem to draw extra attention at the show this year were electric and autonomous vehicles. The interest in the latter class of vehicles was not surprising given the amount of attention being paid to the efforts that both auto companies and technology companies are putting into developing cars that will do all the driving. Interestingly, this technology effort, including Chevy's new Bolt fully-electric subcompact that was introduced at last year's auto show, was highlighted at the Consumer Electronics Show held in Las Vegas at about the same time as the auto show. The attention given to electric vehicles at the show was somewhat surprising given that they are not selling well given the decline in gasoline prices.

**The average cost for all grades of gasoline in 2015 was \$2.52 per gallon, down 26.7% from 2014**

According to the Energy Information Administration's (EIA) web site, the average cost for all grades of gasoline in 2015 was \$2.52 per gallon, down 26.7% from 2014. Diesel prices in 2015 fell even more, dropping by 29.2% from \$3.825 in 2014 to \$2.707 per gallon. Demand for new autos is being driven by pent up consumer demand, the large decline in gasoline pump prices, an improved economy and jobs market, readily available credit and attractive lease terms for financing purchases. As a result, auto sales soared last year. According to *Automotive News* and based on monthly sales figures through December, U.S. new car and light truck sales in 2015 reached 17.47 million units, up 5.7% from 2014's sales.

**Possibly troubling is that December's sales figures were below the expectations of Wall Street analysts who research the auto manufacturers**

December's monthly sales volume of 1,641,913 units, up 8.9% from the same month in 2014, was the best monthly performance for the year. It was, however, the lowest monthly seasonally-adjusted annual rate of sales since June. Possibly troubling is that December's sales figures were below the expectations of Wall Street analysts who research the auto manufacturers. *Automotive News* wrote in its sales roundup article that "most analysts had forecast a seasonally adjusted annual sales rate above 18 million and a 12-month total of 17.5 million light vehicles." Does the miss suggest that the auto market could be weakening? If so, that could present a challenge for estimates for U.S. economic growth in 2016, but more on that later.

**2015's sales volume marked the sixth consecutive year of increasing new vehicle sales**

Importantly, 2015's total sales figure surpassed the all-time high for industry sales of 17.35 million units recorded in 2000. Equally important for the industry was that 2015's sales volume marked the sixth consecutive year of increasing new vehicle sales following the 2008-2009 financial crisis and recession that crushed the industry and led to the bankruptcy and subsequent federal government bailout of General Motors (GM-NYSE).

**The electric cars sold in 2015 represented only 0.7% of total new vehicle sales for the year**

Among all the industry sales statistics was one that was not surprising, but represents another challenge for the auto industry if it isn't soon corrected. That statistic was for sales of battery-electric and plug-in hybrid vehicles sold in 2015, which only totaled 115,000 units, down from 120,000 units sold in 2014. The electric cars sold in 2015 represented only 0.7% of total new vehicle sales for the year. Why is this sales statistic troubling? It is because the industry needs to sell more of these highly fuel-efficient vehicles if they are not going to fall prey to fines for failing to meet the government's Corporate Average Fuel Efficiency (CAFE) standards.

**Traditional car sales remain weak, falling 3.8% last month and 2.3% for the year**

Last year, trucks, SUVs and crossovers continued to set the sales pace, jumping 19% in December and 13% for all of 2015. Traditional car sales remain weak, falling 3.8% last month and 2.3% for the year. Bill Fay, group vice president and general manager for the Toyota division of Toyota Motors (TM-NYSE) said in a statement, "2015 was a standout year for the auto industry. Best-ever light truck sales helped the Toyota division earn the retail sales crown for the fourth consecutive year."

**Expectations had called for global auto sales in 2015 to increase by 2% over 2014**

While U.S. auto sales in 2015 were healthy, we hear comments on investment shows from auto analysts, investors, car company executives and even economists suggesting that vehicle sales for the non-U.S. auto industry were not quite as robust as originally anticipated. Expectations had called for global auto sales in 2015 to increase by 2% over 2014. Furthermore, analysts are estimating that global auto sales will rise by 3% in 2016. A very recent investment report from the auto analyst at Scotiabank (BNS-NYSE) estimates that global auto sales (including U.S. sales) totaled 72.49 million units in 2015, up 1.9% from 2014's figure. This analyst is

**Cumulative miles traveled through October 2015 increased 3.4% over those traveled in 2014**

projecting 2016 global auto sales to increase by 2.7% to 74.47 million units. His U.S. auto sales figure is consistent with the mid-November 2015 forecast by the economist for the National Automobile Dealers Association (NADA) of 17.7 million units being sold in 2016.

With crude oil prices now trading around \$30 a barrel, the decline in gasoline pump prices may be ending. As oil prices were falling below \$30 a barrel recently, the media reported a story about gasoline stations in a town in Michigan selling fuel for \$0.50 a gallon. We aren't sure whether this wasn't merely a stunt. However, there are locations around the country where media reports have gasoline pump prices around \$1.00 a gallon. Presumably, low gasoline prices are simulating driving that should help boost gasoline sales volumes. According to the latest data on vehicle miles driven collected by the Department of Transportation, cumulative miles traveled through October 2015 increased 3.4% over those traveled in 2014. One can see from the chart in Exhibit 3 how the recent upturn in vehicle miles traveled have been driven by lower petroleum prices since late 2014.

**Exhibit 3. Low Gas Prices And Better Economy Boost Driving**



Source: St. Louis Federal Reserve Bank

**Trucks, SUVs and crossovers accounted for 13% of all U.S. vehicles sold last year**

This driving response to reduced gasoline pump prices is good for oil demand. The lower pump prices have also influenced the vehicle purchasing decisions of consumers. As mentioned above, trucks, SUVs and crossovers accounted for 13% of all U.S. vehicles sold last year. Those are among the least fuel-efficient vehicles manufactured, which is hurting the fuel-efficiency rating of the fleet of new vehicles sold. According to the University of Michigan Transportation Research Institute's monthly report on the fuel-efficiency of new vehicles sold, based on the window-sticker value, in December 2015 the fleet averaged 24.9 miles per gallon (mpg), down 0.2 mpg from a revised November estimate. For all of 2015, the fuel-efficiency rating was 25.3 mpg, down 0.1 mpg from the

**An electric vehicle is counted twice while a hybrid vehicle is weighted by one and half times, which helps increase overall fuel-efficiency for a fleet of new vehicles sold**

**There is also a possibility electric vehicles are being primed to meet a significant portion of the envisioned autonomous vehicle market**

value for the vehicles sold in 2014. How does this performance fit with the CAFE standards agreed to between the auto manufacturers and the Obama administration in 2012?

That agreement called for the industry to increase fuel economy to the equivalent of 54.5 mpg for cars and light-duty trucks for model year 2025. This agreement built on an earlier one negotiated with the auto manufacturers for model years 2011-2016 calling for a 35.5 mpg standard for 2016. According to the latest data from the National Highway Traffic Safety Administration (NHTSA), the fuel economy performance for the entire fleet in 2014 was only 31.5 mpg versus that year's standard calling for 34.2 mpg. What most people don't realize about the CAFE standard is that certain vehicles, especially highly efficient ones, are given a greater weighting in the calculation. An electric vehicle is counted twice while a hybrid vehicle is weighted by one and half times, which helps increase overall fuel-efficiency for a fleet of new vehicles sold.

A review of the workings of the CAFE standards helps to explain how auto manufacturers may be strategizing about their future vehicle offerings. That may explain why there seemed to be an increased interest in electric vehicles and other alternatively-powered vehicles, especially as the 2016 standard is imminent. There is also a possibility electric vehicles are being primed to meet a significant portion of the envisioned autonomous vehicle market.

We found it instructive to understand how auto manufacturers may determine their financial exposure to meeting, exceeding or falling short of a particular year's CAFE standard. The information is posted on the NHTSA's web site and is reproduced below.

"Once a manufacturer's CAFE standard is calculated for each of its fleets, NHTSA compares each of the fleet's actual mpg performance against the applicable standard. If a manufacturer's actual average mpg level for a given fleet exceeds the applicable standard, then the manufacturer earns "credits." A credit is earned for each 1/10 of a mpg in excess of the fleet's standard mpg and the actual average mpg. Total credits are calculated as the number of tenths of a mpg (1/10 mpg) times the number of vehicles produced for that fleet. On the other hand, if a manufacturer's actual average mpg level for a given fleet does not meet the applicable standard, then the manufacturer has a "shortfall" for that fleet. Shortfalls can be satisfied by using one of the following compliance flexibilities:

"Carry forward - credits earned in a particular model year can be carried forward and applied for up to five model years after the year in which the credits were earned.

"Carry back – credits earned in a particular model year can be carried backward and applied for up to three model years before the year in which the credits were earned.

**Consumers entering dealer showrooms late in a model year will find that their only vehicle choice is an electric car or a hybrid model at a higher cost**

“Civil penalty – manufacturers can pay a civil penalty equal to \$5.50 per credit shortfall

“Trade – manufacturers can acquire credits from other manufacturers or credit holders.

“Transfer – manufacturers can transfer credits from one of their fleets (DP, IP, or LT) to one of their other fleets.”

If the financial burden of failing the CAFE standard is too great, an auto company can incentivize dealers to sell more fuel-efficient vehicles. If gasoline pump prices remain low hurting more fuel-efficient vehicles, it may come down to a situation where consumers entering dealer showrooms late in a model year will find that their only vehicle choice is an electric car or a hybrid model at a higher cost as those sales will be needed by the manufacturer to minimize or avoid regulatory fines.

**These changes may reflect more of the unintended consequences from low oil prices**

The drop in oil prices has opened the door for auto companies to sell less fuel-efficient cars that actually carry greater profit margins. For auto companies, the interaction of low oil prices and higher fuel-efficiency standards may force changes in the auto market that people haven't thought about. These changes may be further compounded by slowing global economic growth as now forecast by the International Monetary Fund. These changes may reflect more of the unintended consequences from low oil prices.

## **New Icebreakers: Unneeded Or Climate Change Insurance?**

**Russia has 42 working icebreakers and is currently building 14 new ones**

We were intrigued to read of the plans announced by the U.S. Coast Guard to acquire two new heavy icebreakers at an expected cost of \$1 billion each. The head of the Coast Guard indicated he would be meeting with shipbuilders in March to discuss the plans and presumably to begin securing proposals. The United States currently has two active heavy icebreakers, but a third has been out of commission for five years with engine problems. In contrast, Russia has 42 working icebreakers and is currently building 14 new ones. We do not know the mix of Russia's icebreakers between those that can handle heavy versus light ice. What we do know is that the Russians are building the world's largest nuclear-powered icebreaker capable of operating in three meter (9.8 feet) thick ice. They are also building the world's largest diesel-powered icebreaker capable of operating autonomously for 60 days in two meters (6.6 feet) thick ice.

**The Department of Homeland Security, which oversees the Coast Guard, has stated that it may need as many as six new icebreakers**

The Department of Homeland Security, which oversees the Coast Guard, has stated that it may need as many as six new icebreakers to protect and support U.S. interests in polar regions. The last three White House budget submissions, however, cut the development funding for these ships and pushed back the date for the vessels' planned purchase. Now, President Barack Obama has revived the

**For the Coast Guard with an annual budget of about \$10 billion, the estimated \$1 billion cost for these proposed new icebreakers would impose serious spending challenges**

project and has called for the U.S. to have at least one new heavy icebreaker in service by 2020. The Coast Guard has said that while the primary focus of these new icebreakers will be Arctic waters, they would also be available to support national-security interests in Antarctica.

The U.S. Government Accountability Office, a congressional watchdog, said that the proposed Obama timeline means that a new icebreaker would not enter service until 2024, leaving the U.S. with no heavy icebreakers for up to six years unless the government refurbishes the two aged vessels again. For the Coast Guard with an annual budget of about \$10 billion, the estimated \$1 billion cost for these proposed new icebreakers would impose serious spending challenges. The Coast Guard may consider leasing the new ships as a cost-saving step. They are also considering sharing the U.S. icebreaking technology with other countries in order to be able to build vessels cheaper than the U.S. shipyards. Some naval observers wonder whether it would make sense for the U.S. to partner with another country such as Finland or Canada and jointly operate new ships.

**Depending on how those borders are adjusted, certain countries could see their mineral and natural resource potential greatly enhanced at the expense of others who would lose access**

Global warming has been cited for changing the future for the Arctic by melting the ice and opening up the Northwest Passage for year-round shipping and for exploitation of natural resources in the region. There has been a race by the handful of countries with territorial claims in the Arctic as the United Nations will soon be examining those claims and adjusting current country borders within the region. Depending on how those borders are adjusted, certain countries could see their mineral and natural resource potential greatly enhanced at the expense of others who would lose access. For this reason, during the past 5-10 years there has been a keen focus by those countries bordering the Arctic for staking their claim to the maximum areal extent possible in the region.

**He wrote, “Scientists project that the Arctic will be ice-free in the summer of 2013”**

Ignoring for the moment the issue of resource control, we are curious as to why we need these new icebreakers when, according to key members of the Obama administration and environmentalists, all the ice in the Arctic will be melted due to global climate change. In fact, Secretary of State John Kerry, when he was still a senator from Massachusetts, wrote an op-ed that was published in the *Huffington Press* about the future of the Arctic. He wrote, “Scientists project that the Arctic will be ice-free in the summer of 2013. Not in 2050, but four years from now. Make no mistake: catastrophic climate change represents a threat to human security, global stability, and – yes – even to American national security.” Shortly after that op-ed was published, *politifact.com* subjected the claim to its truth-o-meter and concluded it was Barely True. They subsequently changed their rating system and now rate Sec. Kerry’s statement as Mostly False.

In 2013, the extent of summer ice cover in the Arctic was down but there was still ice present. A satellite photo of the Arctic during that September shows the extent of the ice cover. Sec. Kerry's prediction did not come to pass, validating the *politifact.com* rating of his statement.

**Exhibit 4. 2013 Arctic Ice Cover Proves Kerry Wrong**

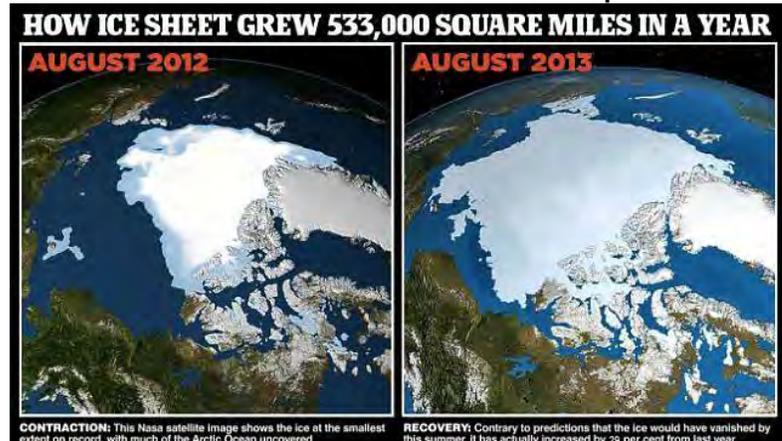


Source: NASA's Goddard Space Flight Center Scientific Visualization Studio, Sept. 12, 2013

**Note that despite the planet continuing to warm in 2013, the extent of the ice cover increased by 533,000 square miles**

The interesting fact is that the summer of 2012 produced the least amount of ice coverage in the modern era. The following year, although the planet continues to warm as we pass between glacial periods, the ice coverage was below the range of ice measurements for 1979-2000, however, the extent of ice was significantly greater than during 2012. Exhibit 5 shows side by side pictures of the Arctic ice cover during August of 2012 and 2013. Note that despite the planet continuing to warm in 2013, the extent of the ice cover increased by 533,000 square miles.

**Exhibit 5. 2012 and 2013 Arctic Ice Extent Comparison**

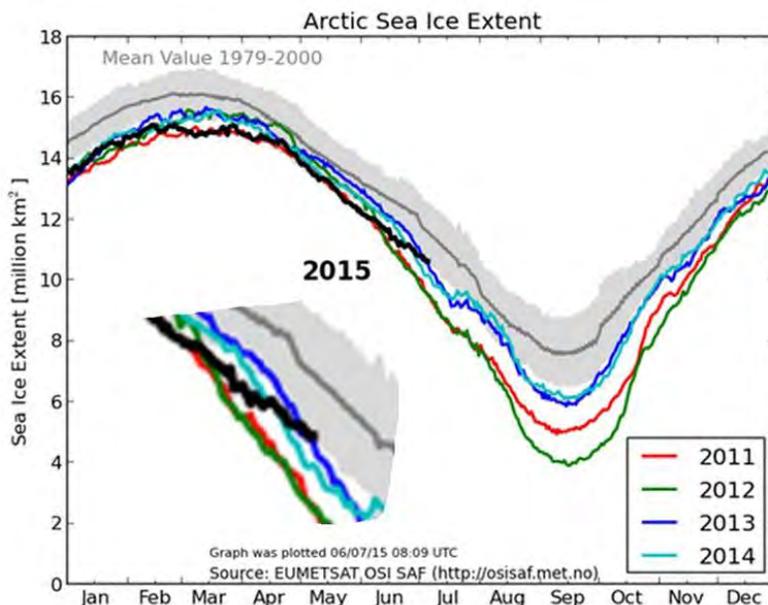


Source: The Daily Mail UK

**Now, a new forecast from the U.S. Navy suggests that 2016 might be the year when the summer ice melt totally eliminates the ice cover in the Arctic**

As reported by the National Snow and Ice Data Center in Boulder, Colorado, this past year the ice coverage in the Arctic fell to the fourth lowest in modern times. A chart prepared by the UK Met weather service (Exhibit 6) shows the historic 1979-2000 range of ice coverage along with the median for that period. The chart also tracks the monthly extent of ice coverage for 2011-2014 including for part of 2015. Based on what we know the government has said about all of 2015's ice coverage, the year's track would have fallen somewhere between the bright blue line representing 2013 and the lighter blue line for 2014. Now, a new forecast from the U.S. Navy suggests that 2016 might be the year when the summer ice melt totally eliminates the ice cover in the Arctic.

**Exhibit 6. Recent Arctic Ice Extent At Lows**



Source: UK Met Office

**Following the discovery of oil in Alaska's Prudhoe Bay in the 1960s, three oil company partners, led by Exxon at that time, decided to test the idea of using icebreaking tankers as the way to ship the oil to market**

Following the discovery of oil in Alaska's Prudhoe Bay in the 1960s, three oil company partners, led by Exxon at that time, decided to test the idea of using icebreaking tankers as the way to ship the oil to market. Exxon was supported financially in this effort by partners BP (Amoco) and Arco. The target market was the heavily populated U.S. East Coast, which meant a 4,400 mile voyage through the Northwest Passage to the New York/Philadelphia area. A little less than half that distance would be through ice cover. Because of that challenging condition, it was determined that modeling of the ship's performance was not feasible. Therefore, Exxon chartered the SS Manhattan, an American flag cargo vessel, which at the time of its delivery to its owner in 1962 was the largest tanker afloat only to lose that title six weeks later when a larger tanker was delivered. The SS Manhattan was considered ideal for the route as it was the only twin-propeller tanker over 100,000 dead-weight tons (dwt) in

**The bow was designed to break the ice by the ship's weight**

service. In addition, it had short cargo tanks and its Class C steel deck and upper hull plating were deemed suitable for the experiment. The ship underwent a seven-month upgrading that involved strengthening the hull, installing an icebreaker bow and beefing up the propellers and rudder as well as their support and protective arrangements. The bow was designed to break the ice by the ship's weight.

**Exhibit 7. SS Manhattan Makes It Way Through Arctic Ice**

Source: ExxonMobil

**The ship made two passages between Alaska and the U.S. East Coast, successfully hauling a cargo of water to simulate the weight of a fully loaded tanker**

The SS Manhattan was able to maintain speed in ice up to four feet thick, although it was not likely to encounter ice of uniform thickness. The ship was designed to handle second-year ice characterized by ridges and blocks of ice extending sometimes as much as 50 feet below the waterline, for which ramming was necessary for passage. The modifications and testing cost approximately \$4 million (\$250 million in today's dollars). The ship made two passages between Alaska and the U.S. East Coast, successfully hauling a cargo of water to simulate the weight of a fully loaded tanker. The test data was utilized in a model basin testing program that considered the feasibility of icebreaking tankers of up to 300,000 dwt. The tests showed that such tankers would require propulsive power four to five times greater than that required for conventional tankers. In addition, the entire hull structure would need to be constructed of low-temperature steels to withstand the Arctic winter without becoming brittle, significantly increasing the vessel's cost. In October 1970, the oil companies decided to utilize a pipeline to move their oil from Prudhoe Bay to market.

**Hedging one's bets on climate change predictions is probably the safest step to take and maybe we should be applauding the judgement of the Obama administration**

The decision to possibly build two new heavy icebreaker ships may reflect insurance against forecasts that an ice-free era proves wrong. Then again, ice does have a tendency to form during the winter in the Arctic, so if a ship needed help an icebreaker would be ready to assist. Cargo ships presumably wouldn't be using the Northwest Passage during the winter, understanding the risks of being trapped by surface ice. Maybe the federal government still secretly expects oil and mining companies to explore whatever part of the Arctic region the U.S. secures following the UN's determination of ownership in the region. At the moment that scenario is hard to believe given Royal Dutch Shell's (RDS.A-NYSE) decision to abandon its Arctic oil exploration adventure. Hedging one's bets on climate change predictions is probably the safest step to take and maybe we should be applauding the judgement of the Obama administration. Then again, maybe the Coast Guard didn't get the latest climate change memo from the White House.

## **Public Lands: Is Methane The Common Denominator?**

**The proposed rules would force petroleum companies to use equipment to capture leaked gas**

Late last week the Obama administration released a proposed new rules aimed at curbing emissions of methane, a dangerous greenhouse gas emissions, from oil and gas drilling operations on public land. The proposed rules would force petroleum companies to use equipment to capture leaked gas, which would raise the costs those companies will pay for extracting crude oil and natural gas on public lands.

**The Obama administration wants to cut methane emissions from the petroleum sector by 40%-45% from 2012 levels by 2025**

The new rules, which are open for public comment before finalization, targets emissions of methane, a chemical contained in natural gas that is about 25 times more potent than carbon dioxide, although it lasts in the atmosphere for significantly less time than carbon dioxide. The Obama administration wants to cut methane emissions from the petroleum sector by 40%-45% from 2012 levels by 2025.

**The rules will also enable the Department of the Interior to levy royalties on any leaked or flared natural gas on federal lands**

At the moment there is a high-profile natural gas pipeline leak in Los Angeles that has been spewing methane for several months and requires several more weeks before it can be stopped. The proposed methane rules, however, will not deal with accidental releases of natural gas such as from a leaky pipeline. Rather, they are aimed at accidental gas leaks at well sites during drilling operations and at the process of venting and burning off leaked gas – referred to as flaring. Operators would have to use specialized equipment to both capture leaked natural gas and to limit the process of releasing and flaring gas. The rules will also enable the Department of the Interior to levy royalties on any leaked or flared natural gas on federal lands, which will have the effect of increasing the cost for companies of operating wells on government property, a goal of the administration.

**Cattle are also often a pawn in the battle over meat consumption**

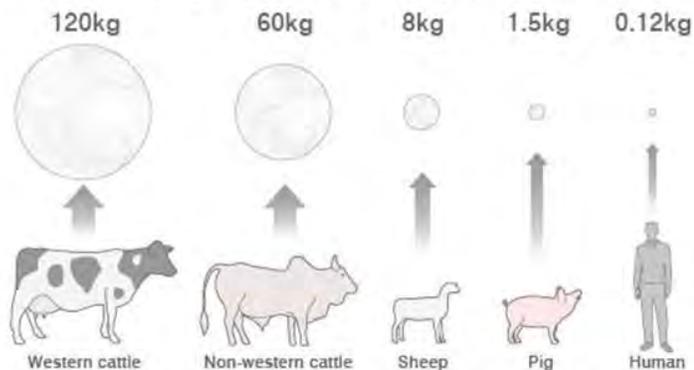
We thought the timing of the proposed rule was interesting since disputes over the use of public lands for cattle grazing have become high profile recently. The current standoff in Oregon and the past confrontations between ranchers and rangers in Nevada are the most high profile incidents to date. Cattle are also often a pawn in the battle over meat consumption, especially as environmentalists and health groups try to convince people not to eat meat or consume dairy products in the name of climate change.

**The effect of methane, or CH<sub>4</sub>, on the climate is 23 times greater than the effect from CO<sub>2</sub>**

The effect of methane, or CH<sub>4</sub>, on the climate is 23 times greater than the effect from CO<sub>2</sub>. However, methane lasts for a much shorter time in the atmosphere than CO<sub>2</sub>. Although the Goddard Institute for Space Science (part of the National Aeronautical and Space Administration (NASA)) gives a higher figure for the amount of methane a cow releases each year (see Exhibit 8), an environmental web site used 100 kilograms (kg) (220.5 pounds) to calculate the impact of cows on the climate. Each cow emits methane equal to 2,300 kg (5,071 pounds) of CO<sub>2</sub> per year. That is the same amount of CO<sub>2</sub> generated by burning 1,000 liters (264 gallons) of gasoline, equal to the volume needed to drive 12,500 kilometers (7,800 miles) at the rate of eight liters (2.1 gallons) per 100 kilometers (six miles).

**Exhibit 8. Cow Emissions Are Worse Than Humans**

Methane emissions per animal/human per year



SOURCE: Nasa's Goddard Institute for Space Science

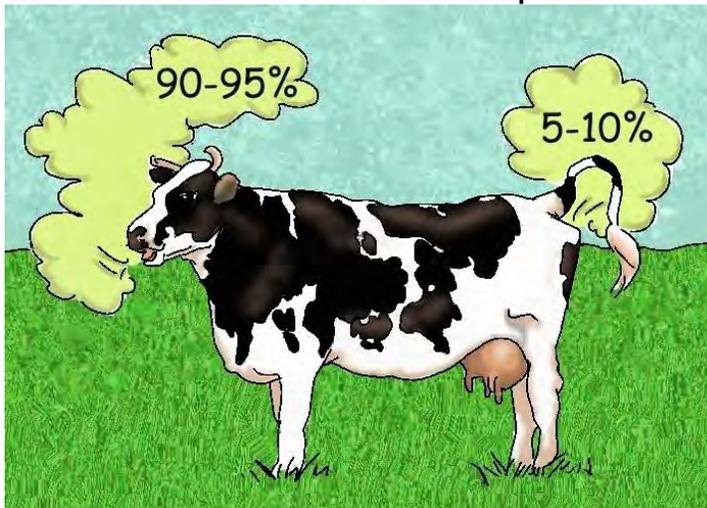
Source: NASA

**The EPA says that livestock represents almost one-third of the emissions from the agricultural sector**

According to the Food and Agriculture Organization of the United Nations, agriculture is responsible for 18% of greenhouse gases emissions worldwide. That is more than the world's transportation sector emissions. To show the difference in importance of agriculture worldwide, in the United States, according to the Environmental Protection Agency (EPA), agriculture accounted for only 9% of greenhouse gas emissions in 2013. Livestock, especially cattle, produce methane as part of their digestion process. In fact, burps account for 90%-95% of all the methane released by cows with the balance coming from their flatulence. The EPA says that livestock represents almost one-third of the emissions from the

agricultural sector. Another major emissions release comes from manure management. The EPA says this accounts for about 12% of the total greenhouse gas emissions from the U.S. agricultural sector.

**Exhibit 9. Cow Emissions Have Blown Up Barns**

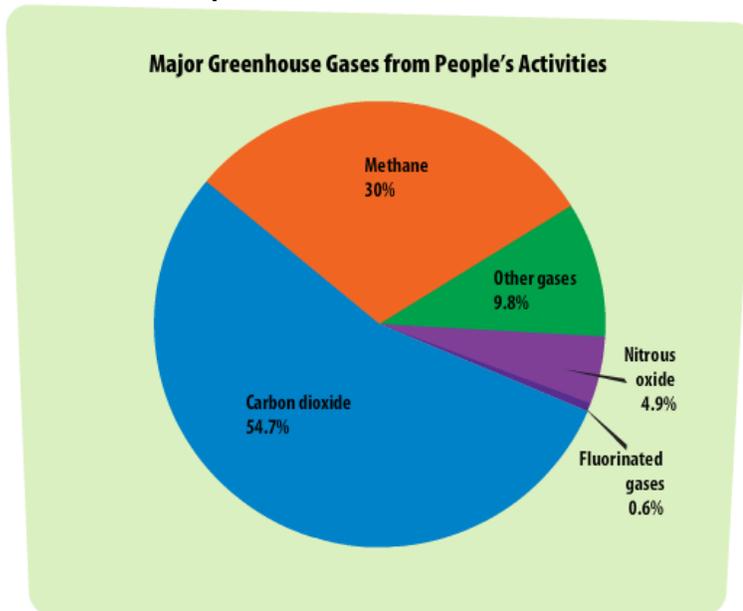


Source: [fritz-aviewfromthebeach.blogspot.com](http://fritz-aviewfromthebeach.blogspot.com)

**Methane accounts for 30% of greenhouse gas emissions**

To understand the significance of methane, the EPA produced a chart (Exhibit 10) showing the composition of greenhouse gases. Methane accounts for 30% of greenhouse gas emissions while carbon dioxide represents about 55%.

**Exhibit 10. Composition Of Greenhouse Gas Emissions**

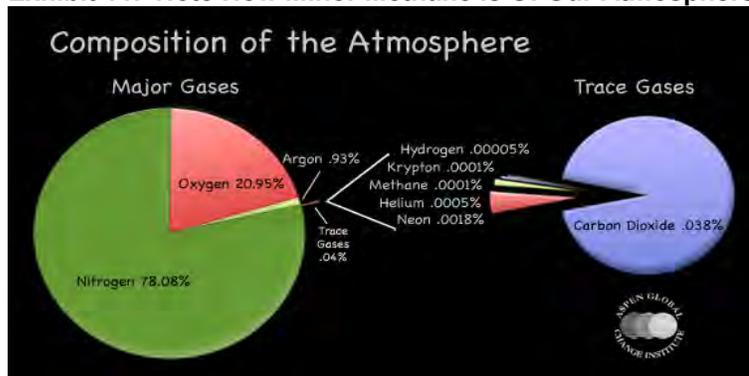


Source: EPA

**Methane is a trace gas within a grouping of trace gases that barely register in the atmosphere**

Maybe more interesting is to see the composition of methane in the entire atmosphere. Methane is a trace gas within a grouping of trace gases that barely register in the atmosphere. The entire trace gases group is dominated by carbon dioxide, which represents 95% of the group's volume.

**Exhibit 11. Note How Minor Methane Is Of Our Atmosphere**



Source: ingenious.com

**According to the United Nations, the Earth's atmospheric methane concentration has increased 150% since 1750**

Cows are perceived to be a serious methane problem – nearly as devastating as the methane released by the fossil fuel industry. Quite possibly, cows in the future will be wearing gas bags to capture their methane emissions since the captured gas can be turned into fuel, or buried rather than emitted. According to the United Nations, the Earth's atmospheric methane concentration has increased 150% since 1750. It reportedly accounts for 20% of the total radiative forcing from all of the long-lived greenhouse gases. This calculation doesn't include water vapor, which is by far the largest component of the greenhouse effect and creates a feedback loop to warming temperatures and can augment the warming of methane and CO<sub>2</sub>.

**Exhibit 12. The New Fashion Statement For Cows**



Source: ecouterre.com

We would not be surprised to see a move at some point to ban the consumption of meat, largely on health concerns, but supported by a push to help fight climate change. The world could get an emotional twofer. Cows as an endangered species someday?

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