



MUSINGS FROM THE OIL PATCH

July 16, 2019

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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

Summary:

Vehicles, Driving And The Future Of The Gasoline Market

June domestic auto sales were stronger than expected. Electric vehicle sales were particularly strong, suggesting that our vehicle fleet is in transition. It means gasoline and oil demand may be nearing a peak.

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EnSCO Rowan Name Change Marks New Offshore Drilling Era

The decision to rename the newly merged offshore driller EnSCO Rowan sadly marks the end of two great names in the industry. We review many of the great names, led by giants in the industry, that no longer exist.

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Climate Change Media Is Taken to Task For Lack Of Honesty

Only one climate model has successfully replicated global temperatures for the past 160 years. That model does not depend on CO₂ to drive its outcome, but importantly, it projects the least temperature rise to 2100.

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Oil Prices On The March Despite Demand Challenges

Large oil and gasoline inventory draws coupled with heightened geopolitical tensions in the Middle East are pushing oil prices higher. Tropical Storm Barry is also helping oil prices. Demand, however, remains at issue.

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Vehicles, Driving And The Future Of The Gasoline Market

There was substantial interest in what high-profile electric vehicle (EV) manufacturer Tesla Inc. (TSLA-Nasdaq) would report for its second quarter sales

As the calendar flipped to July, all eyes in the investment world focused on the June sales report for the U.S. automobile industry. There was substantial interest in what high-profile electric vehicle (EV) manufacturer Tesla Inc. (TSLA-Nasdaq) would report for its second quarter sales. Tesla, along with General Motors (GM-NYSE) are the only two auto companies not reporting monthly sales data. That forces vehicle sales trackers to develop alternative data sources to estimate monthly sales, with the idea of balancing their monthly estimates when the quarterly data is released. After struggling for a while, these vehicle sales trackers have become more accurate, so there is less concern about the accuracy of monthly sales estimates.

The intense interest in the June auto sales data was elevated by concern over a potential economic recession, which would contribute to weaker auto sales. Additionally, for Tesla, its poor sales results for the first quarter had investors wondering whether the company was heading for a financial liquidity crisis, as it has substantial debt payments due in the second half of 2019. Second quarter sales would tell investors how healthy Tesla is financially, as well as whether the weak first quarter sales signaled a demand problem for EVs.

Sales are expected to continue to be lower in the second half, as the U.S. auto market slows from years of extremely strong sales

For the automobile industry, Tesla, and the U.S. economy, June's auto sales eased fears of immediate problems – or at least they should be put on hold for another quarter. June total sales marked the sixth consecutive month of lower year-over-year sales, but the annualized sales figure was 17.3 million units, according to research firm *J.D. Power*. Still, sales are expected to continue to be lower in the second half, as the U.S. auto market slows from years of extremely strong sales reflecting recovery from the 2009 recession. Industry forecasters are estimating 2019 sales will only reach 16.9 million units, below the 17+ million annual units sold on average over the past four years.

The automobile market has been pressured by higher vehicle prices and rising interest rates. The average vehicle's sales price in June was \$33,350, up 4% from a year ago. At the same time, auto loan interest rates, while weakening in June, are still up from last year. These two forces have driven many car buyers to the used car market where many late-model cars sit on dealer lots, partly a result of the ending of auto leases from the strong sales years of the past.

Only Ford Motor Company (F-NYSE), of America's big three auto companies, posted an increase over last year. GM's sales were down 4%, and Fiat Chrysler Automobiles N.V. (FCAU-NYSE) was off 2%. Foreign car manufacturer Toyota Motor Corp.'s sales (TM-NYSE) were down 3%, Honda Motor Co. Ltd.'s (HMC-NYSE) were slightly off by 1.4%, but Nissan Motor Co. Ltd.'s (NSANY-OTC) sales

Tesla also stated that its order backlog increased since the beginning of the second quarter, giving pause to the concerns over a demand falloff

were 8.2% lower. Second quarter records were set by Tesla, to the surprise of even its most ardent supporters. The company delivered over 95,000 cars in the second quarter, while building over 87,000, both records. Tesla also stated that its order backlog increased since the beginning of the second quarter, giving pause to the concerns over a demand falloff.

With U.S. auto sales better than anticipated, how is the EV market doing? According to *Insideevs.com*, June's sales of 37,818 EVs was solid, up 51.1% over the same month in 2018. For the first half of 2019, EV sales are up 19.7%. To appreciate just how strong June EV sales were, *Insideevs.com* listed the top five months for sales. We would note that June's sales were the fourth largest monthly sales figure, trailing three of the four final months in 2018.

Top Five EV Sales Months

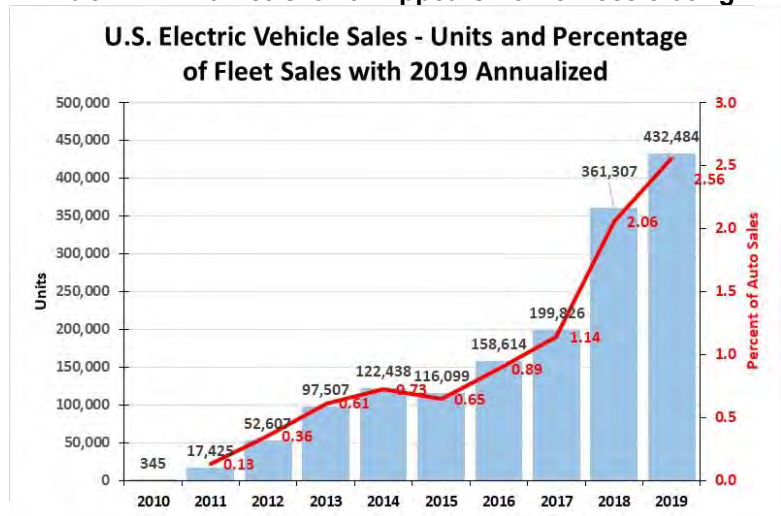
December 2018 – 49,900
 September 2018 – 44,544
 November 2018 – 42,588
 June 2019 – 37,818
 August 2018 – 36,347

It is also interesting to note that EV sales reflect tracking 45 models. The number of choices EV buyers will have in the future will increase, although some current models may be discontinued in favor of more popular choices. The most interesting market development will be when more luxury auto manufacturers introduce models to compete with Tesla.

The strong EV markets in several European countries – Norway, Germany, Britain and France – contributed to the overall market that is primarily driven by China EV sales

Although the U.S. EV market demonstrated healthy gains, they pale in comparison to the growth of the overall EV market (includes the U.S.). Through May, the global EV market expanded 42.1% over the first third of 2018. The strong EV markets in several European countries – Norway, Germany, Britain and France – contributed to the overall market that is primarily driven by China EV sales. For the first four months of 2019, total global EV sales were over 800,000 units, compared to slightly over two million sold in 2018. If we assume the U.S. and global EV markets sustain their year-to-date outperformance over 2018, then the U.S. could see sales of roughly 423,000 units, and the world market at nearly 2.9 million units this year. Against a 16.9 million vehicle sales estimate for the U.S. this year, the EV market share would increase to 2.56 %, a half of one percent market share gain.

Exhibit 1. EV Market Growth Appears To Be Accelerating

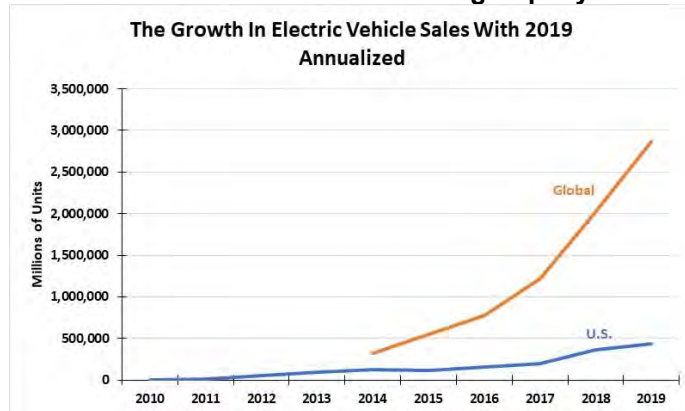


Source: *Insideevs.com*, PPHB

There is no question that EVs are making their presence known in the global auto market

EV sales performance in 2018 was spectacular, an increase of 80.8%! That strength was assisted by the prospect of reduced federal tax credits for new EV buyers for both Tesla and GM, which likely pushed some 2019 sales into 2018. That shift will significantly impact year-over-year sales gains in the second half of 2019. What is impressive is to see how overall global EV sales are doing compared to those in the U.S. There is no question that EVs are making their presence known in the global auto market.

Exhibit 2. Global EV Sales Are Rising Rapidly



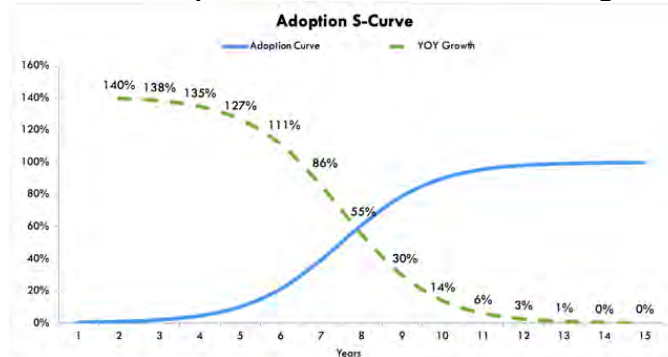
Source: *Insideevs.com*, PPHB

Global EV sales have EV and Tesla proponents very excited. A July 5th article posted on *Seeking Alpha* and written by Sam Korus, an analyst of industrial innovation at ARK Investment Management, a strong supporter of Tesla, EVs and autonomous driving, focused on the EV market's performance against the S-adoption curve. It has been ARK's view that EVs would take off as buyers began

We believe the article was designed to head off criticism of the future erosion of Tesla’s market share

purchasing them just like they do with consumer electronics. We believe the article was designed to head off criticism of the future erosion of Tesla’s market share. To help make the case, Mr. Korus showed how year-over-year growth slows as the adoption curve rises. With Tesla’s U.S. market share at 68%, it is hard to expect it to be sustained or even increase.

Exhibit 3. Adoption S-Curve Results In Slowing Growth

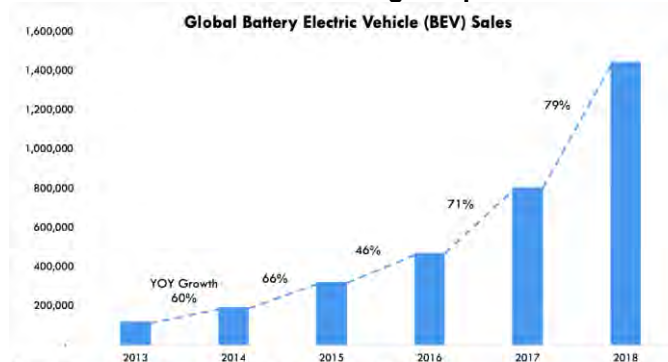


Source: ARK Investment Management LLC, 2019 | ark-invest.com

Source: *Seeking Alpha*

By presenting the adoption curve before the chart of global battery electric vehicle (BEV) sales (a significant proportion of the total EV market), Mr. Korus was attempting to show that the BEV market was in the upward phase of the S-adoption curve.

Exhibit 4. Are BEV’s Following Adoption S-Curve?



Source: ARK Investment Management LLC, 2019 | ark-invest.com; Data from: EVvolumes.com

Source: *Seeking Alpha*

While we can debate the relative merits of S-adoption curves and government support of the EV market, the performance of EV sales has been impressive, and faster than anticipated by most forecasters

We are not aware of S-adoption curve examples of products, especially very expensive and long-lasting capital goods, where the initial growth has been mandated and subsidized by governments. In virtually every market where we have seen subsidies cut or ended, EV sales have slowed sharply. While we can debate the relative merits of S-adoption curves and government support of the EV market, the performance of EV sales has been impressive, and faster than anticipated by most forecasters. Does that mean the end of the gasoline era for personal transportation is at hand?

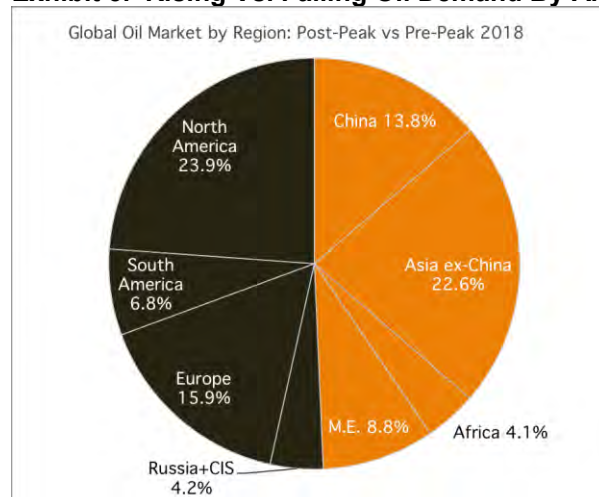
EVs are one aspect of the shift underway, but the impact of ride-hailing services, increased investment in mass transportation infrastructure and adoption of autonomous vehicle technology will all contribute to the demand decline

In the Middle East and Africa, there has been a switch away from oil and toward natural gas for generating electricity

The health and future of the oil business is tied to continued demand growth. Most oil forecasters are calling for a slowing in demand, not just due to potential economic recessions, but structural shifts in the market, most pronounced being changes in the transportation sector. EVs are one aspect of the shift underway, but the impact of ride-hailing services, increased investment in mass transportation infrastructure and adoption of autonomous vehicle technology will all contribute to the demand decline. We would also add maturing economies and ageing populations as demand inhibitors. Add in the growth of the Gen Z population, soon to become our largest population segment, who seem to be much more at ease with social media for transacting business and personal interaction rather than driving, as a further demand depressor.

One proponent of the “end of the oil era is at hand” is energy writer Gregor Macdonald. He focuses on two aspects – declines in oil use by select regions and the growth of EVs. With respect to the first criteria, he presented the chart in Exhibit 5 based on data from BP plc (BP-NYSE) in his newsletter. He made the point that those regions in black were already in decline in their use of oil. He said that Africa and the Middle East also showed lower oil consumption in 2018, putting them, in his mind, in the black, i.e., less oil demand forever. What he fails to understand is that in the Middle East and Africa, there has been a switch away from oil and toward natural gas for generating electricity. It is interesting to note gasoline and diesel/gasoil consumption increased in 2018 in these regions, while jet/kerosene use was flat in Africa and up in the Middle East. Both regions registered declines in fuel oil, which traditionally fuels electric generating facilities.

Exhibit 5. Rising Vs. Falling Oil Demand By Area



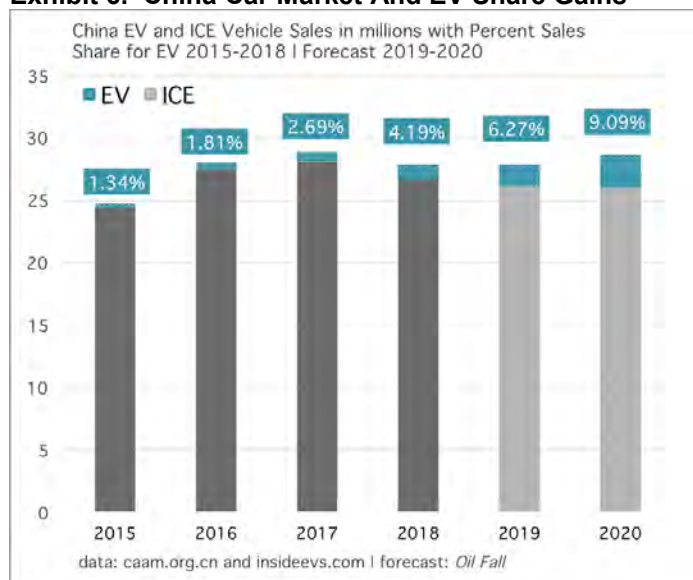
Source: Gregor Macdonald

For Mr. Macdonald, the ICE issue is all based on trends in California and China. Admittedly, China is the “200-pound Gorilla” of the

Even with fewer car sales, NEV sales will grow, capturing an ever-increasing share of total vehicle sales

global EV market because its government has decreed these new-energy vehicles (NEV) will be the future of the country's transportation system. Just like the rest of the world, the huge stock of ICE vehicles in China will make the transition to a 100% NEV fleet a long-term project. Mr. Macdonald has a chart showing the mix of internal combustion engine (ICE) and NEV cars sold in China, as well as the percentage NEV's represent of total vehicle sales. His point was that once ICE car sales peak, China will never sell as many ever again. Even with fewer car sales, NEV sales will grow, capturing an ever-increasing share of total vehicle sales. That may be true for a planned economy such as China, but often not the case in a free market.

Exhibit 6. China Car Market And EV Share Gains



Source: Gregor Macdonald

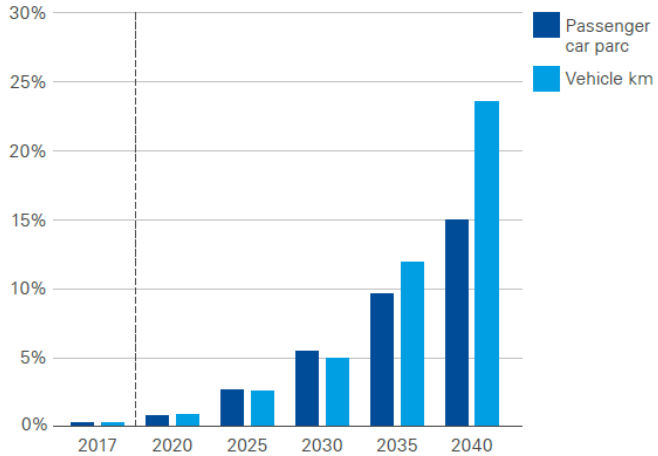
Personal transportation will remain an important component of people's lives and ICE cars and oil use will continue to be a significant portion of fuel consumed

As EVs gain market share globally, we need to watch vehicle miles traveled (VMT) as another indicator of oil's future. Unfortunately, there is no single VMT figure for the world, rather selected countries have easily accessed data. What we do have is fuel sales data compiled by BP that allows us to examine regional transportation trends. Before examining that data, we should examine conclusions from the [BP Energy Outlook, 2019 edition](#), released a few months ago. BP prepares several alternative outlooks based on different assumptions about how the people of the world will live in the future. The conclusion of all their scenarios is that personal transportation will remain an important component of people's lives and ICE cars and oil use will continue to be a significant portion of fuel consumed by future vehicle fleets. These scenarios acknowledge that in the future, oil and ICE vehicles will be less dominant than in the past, which is not necessarily a bad thing, but the transition will likely happen slower than environmentalists would like.

Exhibit 7. How EVs Will Impact Cars and VMT

Passenger car parc and vehicle km electrified

Share electrified



Source: BP plc

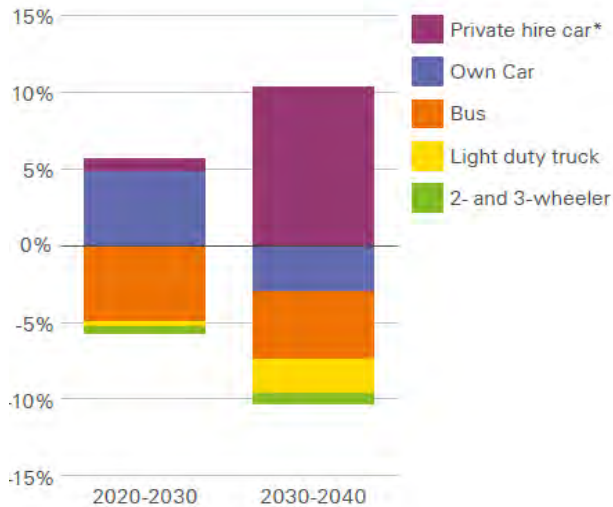
BP now sees EVs reaching 15% of the fleet and account for 24% of total vehicle miles traveled

After having had forecasts in the past that largely marginalized the role of EVs in the transportation sector, BP now sees EVs reaching 15% of the fleet and account for 24% of total vehicle miles traveled. Promoters of EVs would argue that BP’s scenario is still too conservative.

Exhibit 8. Ride-Hailing Will Disrupt Autos

Change in the share of road passenger km

Percentage point



*Includes all forms of taxis

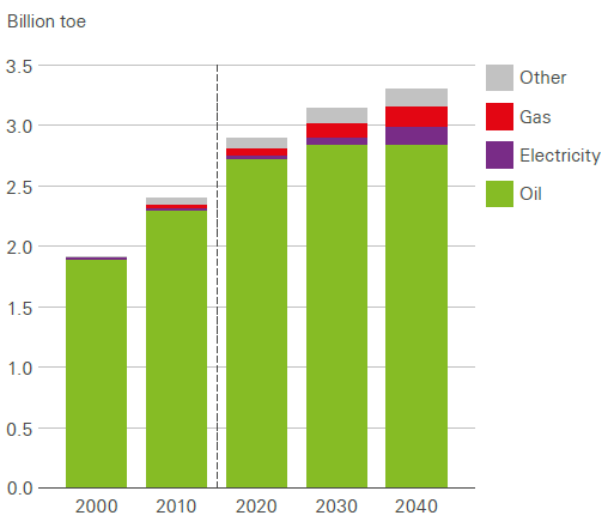
Source: BP plc

Ride hailing and taxi rides will account for about 1% of VMT growth during 2020-2030, but then reaches 10% growth in VMT for 2030-2040

BP also addressed the issue of ride hailing services. BP’s base scenario shows ride hailing and taxi rides will account for about 1% of VMT growth during 2020-2030, but then reaches 10% growth in VMT for 2030-2040, which represents the only road segment to grow during that decade. Exhibit * (prior page) shows how dramatically BP sees the role of personal vehicles changing, as we reach the end of the next decade.

Exhibit 9. Gasoline Demand To Peak In 2030s

Final energy consumption in transport:
Consumption by fuel



Other includes biofuels, coal and hydrogen

Source: BP plc

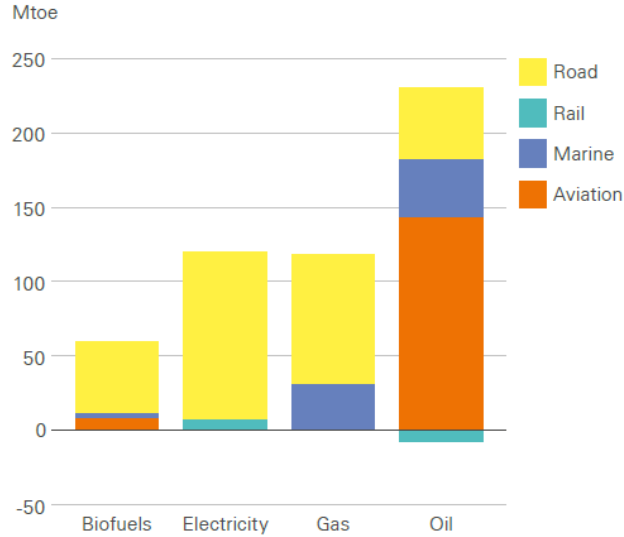
The net impact of BP’s transportation scenario is oil’s use growing over 2010-2020 by almost the same amount as it did during 2000-2010

The net impact of BP’s transportation scenario is oil’s use growing over 2010-2020 by almost the same amount as it did during 2000-2010. What is noticeable is the rapid slowing in oil’s growth during 2020-2030, before being projected to decline in 2030-2040. The other notable trend is the rapid growth in other fuels, such as natural gas, electricity and biomass, in the transportation sector.

When all of these trends are put together, the future of oil during 2017-2040 changes materially. This change highlights challenges renewable fuels have in meeting the needs of the aviation and maritime sectors. The bars for other fuels – biofuels, electricity and natural gas – show where they will make their greatest market impacts. In every case, it will be in road transportation, while gas (in the form of LNG) gains in the maritime sector, electricity gains in rail, and biofuels makes inroads in aviation and maritime.

Exhibit 10. All Fuel Markets Will Be Disrupted

Final energy consumption in transport:
Growth by fuel and mode, 2017-2040

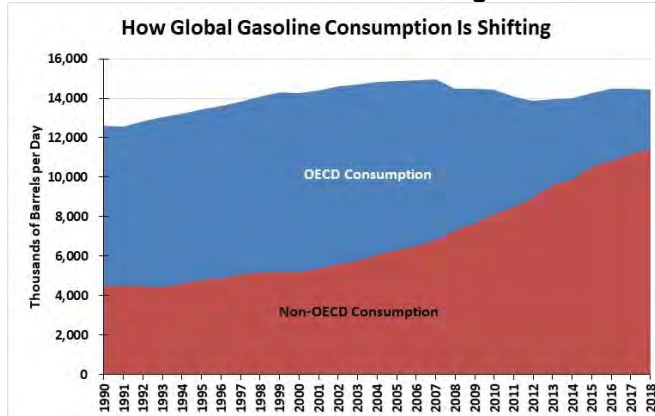


Source: BP plc

Since about 2006, OECD consumption peaked and has been a decline, with the exception of a brief recovery in 2015

Examining gasoline consumption by region shows there has been a shift. The developed economies of the world are peaking in their gasoline use, as populations age and begin declining, and emissions controls have boosted the average fuel-efficiency of the fleet. These trends are obvious when one looks at gasoline consumption by OECD countries (developed) and non-OECD (developing) economies. Since about 2006, OECD consumption peaked and has been a decline, with the exception of a brief recovery in 2015. On the other hand, non-OECD countries have shown a rapid increase in gasoline consumption beginning about 2000, although there was a very slight slowdown in 2018.

Exhibit 11. Gasoline Demand Shifting To Asia

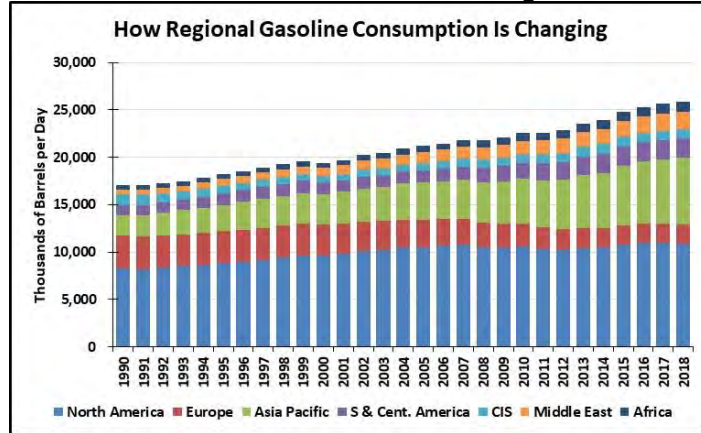


Source: BP plc, PPHB

Last year, Europe, at just over two million barrels per day (mmb/d) of gasoline consumption, was being challenged by the Middle East with 1.8 mmb/d, one of fastest growing regions

The shifting consumption trend becomes clearer when we examine the regional shifts over time. In 1990, the three largest gasoline consuming regions were the United States, Europe and Asia Pacific. Last year, Europe, at just over two million barrels per day (mmb/d) of gasoline consumption, was being challenged by the Middle East with 1.8 mmb/d, one of fastest growing regions. As Europe's population growth slows, and in many countries declines, and EVs gain market share, the Middle East will likely become the third most important region for gasoline consumption.

Exhibit 12. How Gasoline Use Has Changed since 1990

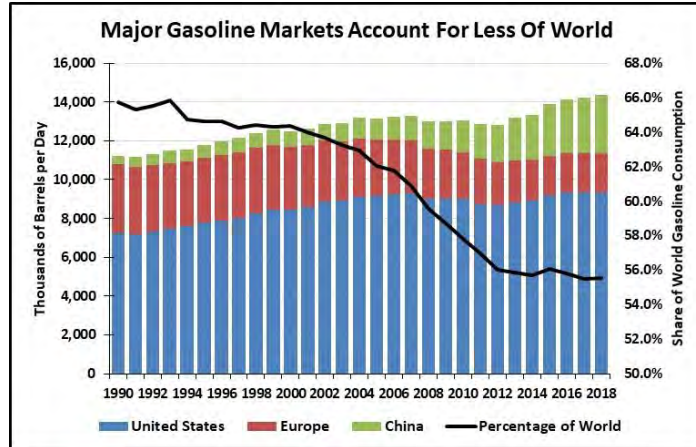


Source: BP plc, PPHB

Will the slowing of market share loss continue or will it reaccelerate?

To further assess the significance of the slowing of gasoline consumption in Europe and the U.S., as well as the rapid growth in China's use, the following chart is helpful. More importantly, the line shows the declining share of global gasoline sales represented by these three markets, despite two of them growing. Will the slowing of market share loss continue or will it reaccelerate?

Exhibit 13. U.S. Continues To Dominate Gasoline Market

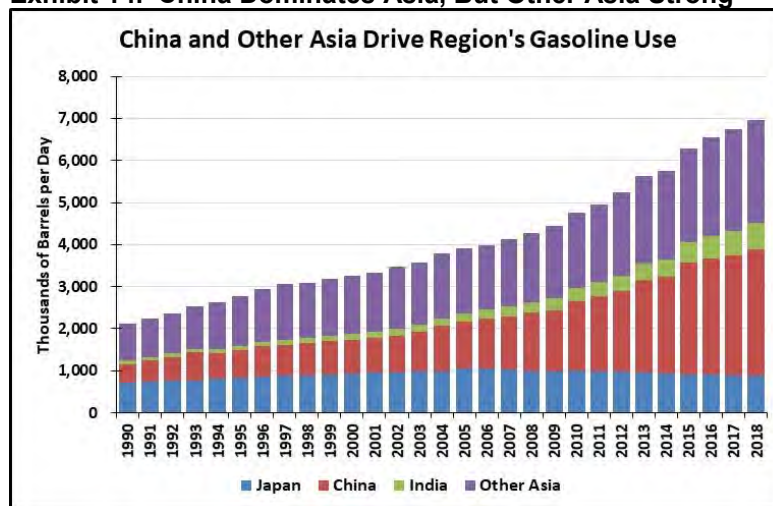


Source: BP plc, PPHB

The one surprise for us was to see how small India's gasoline consumption is relative to that of China

What has become clear is that the growth in gasoline consumption will primarily be driven by increased demand from Asia Pacific. China is the primary consumer in the Asia Pacific region, but the surprising revelation is the growth in Asian countries other than China, Japan and India. The one surprise for us was to see how small India's gasoline consumption is relative to that of China. Presumably that will change if the economic forecasts projecting India challenging China come to pass.

Exhibit 14. China Dominates Asia, But Other Asia Strong



Source: BP plc, PPHB

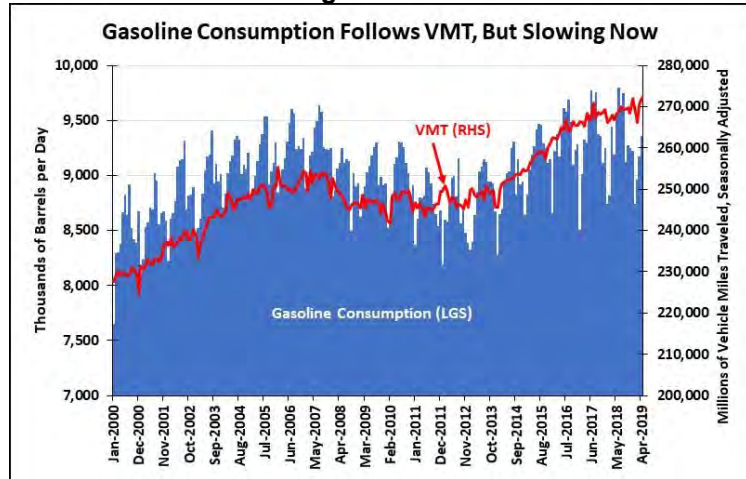
Despite the growing importance of less-developed and developing economies driving global gasoline consumption, the U.S. remains the “big dog” in this market at 9.3 mmb/d of use. Therefore, it becomes important that we examine how this market may be changing as population trends, EVs, consumer attitudes towards personal vehicle ownership and use, and increased fuel-efficiency impacts the gasoline market. VMT becomes a key to this analysis.

Since 2000, gasoline consumption and VMT were closely in sync

What we see is that since 2000, gasoline consumption and VMT were closely in sync. That is logical, as the U.S. vehicle fleet is virtually 100% ICE vehicles. So, as the domestic vehicle fleet grows and VMT rise, even though there is the offsetting pressure from a more fuel-efficient fleet mix, gasoline volumes consumed should rise. When economic conditions change, such as during the 2008-2009 financial crisis and resulting economic recession, job losses reduce commuting VMT, as well as impacting discretionary driving. A healthy economy should support both of these drivers for increased VMT.

The impact of the recession and subsequent recovery is better seen when we chart monthly gasoline consumption against the 5-year average for that month. When monthly VMT traveled, seasonally adjusted, is plotted against gasoline consumption, we see how the

Exhibit 15. Watch Driving To See Gasoline Demand

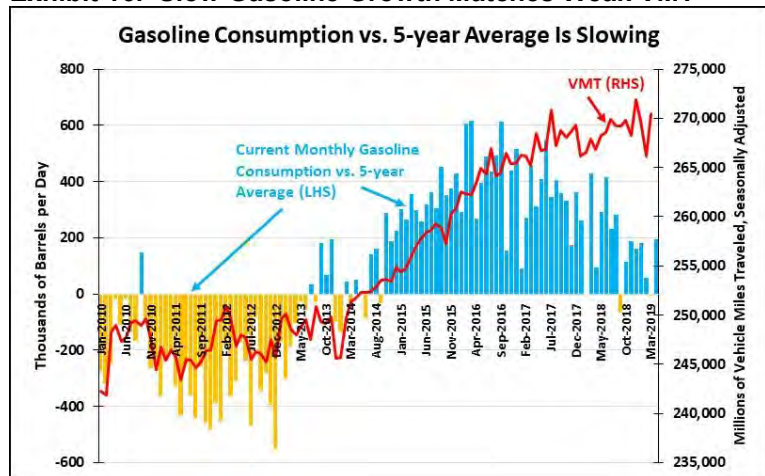


Source: EIA, DOT, PPHB

Years later, they seem to have been more transitory concerns, but that may change in the future

two correspond. Although cumulative VMT had peaked in 2006 and then remained flat or declined until 2014, it was during this time period that analysts spent considerable time attempting to ascertain how much of the cessation in VMT growth was due to factors that would become permanent. Issues such as how changing attitudes of millennials toward personal car use, the ageing of the American population, and the introduction of self-driving vehicles and ride-hailing services were transitioning the personal car segment of the transportation industry were actively studied and debated. These trends were determined to be critical for knowing what would happen to future gasoline demand – a critical factor for the global oil industry’s future. Years later, they seem to have been more transitory concerns, but that may change in the future.

Exhibit 16. Slow Gasoline Growth Matches Weak VMT



Source: EIA, DOT, PPHB

What is significant is how VMT growth has slowed and the monthly increases against the 5-year average of gasoline consumption have declined

What is significant is how VMT growth has slowed and the monthly increases against the 5-year average of gasoline consumption have declined. Are we approaching a turning point for the oil industry in the U.S.? That would be the conclusion of Mr. Macdonald, who sees the defining events for the start of the demise of the oil industry as the peaking of ICE vehicle sales, the increase in EVs sold, and the end of rising gasoline consumption. In his view, the future is defined by peaking activity, which he then assumes will be followed by rapid future declines. The challenge to his oil demand scenario is the assumption of a rapid decline after the peak is reached. While this scenario is reflective of the "peak oil demand" fear, it ignores the oil demand necessary to meet the needs of the existing fleet of ICE vehicles, which will not decline rapidly. People do not discard vehicles merely because version 2.0 has just arrived. As BP points out, the average lifespan of vehicles is 12 years, although their time-in-service is lasting longer due to better construction and greater engine life. Over time, the average vehicle life has been extended, and we believe it is likely to continue.

The oil industry is in the early phase of a transition that will ultimately make it a smaller business

The oil industry is in the early phase of a transition that will ultimately make it a smaller business. We certainly do not expect the transition to happen rapidly. There are many forces acting to change the gasoline and oil markets, not all of them clearly understood. Monitoring these factors will be imperative for understanding how quickly the gasoline and oil markets will be disrupted.

EnSCO Rowan Name Change Marks New Offshore Drilling Era

We were saddened by the news, as two of the hallowed names of the offshore drilling business will soon disappear

In October 2018, EnSCO plc and Rowan Companies plc announced plans to merge, creating the world's largest offshore driller. Barely three months after the April deal's completion, management announced it will change the company's name to Valaris plc. The stock symbol will also change. We were saddened by the news, as two of the hallowed names of the offshore drilling business will soon disappear.

Today, we stand at a similar point in the offshore drilling cycle, as the industry exits its recent industry depression created by collapsing oil prices and begins a new up-cycle

Full disclosure - we worked for the Energy Service Company at the time it became EnSCO in the early 1990s. That was when the company, with the backing of investor Richard Rainwater and led by industry dean Carl Thorne, engineered the purchase of the huge Penrod Drilling Company fleet, owned by the Hunt family. Messrs. Rainwater and Thorne had cooperated in the takeover of Blocker Energy Corporation in the mid-1980s after it ran into financial difficulty following the earlier oil price collapse. Today, we stand at a similar point in the offshore drilling cycle, as the industry exits its recent industry depression created by collapsing oil prices and begins a new up-cycle.

In 2017, the need to restructure the industry through consolidation had prompted EnSCO's acquisition of Atwood Oceanics. That deal followed Transocean Ltd.'s (RIG-NYSE) purchases of Songa

The current offshore drilling sector is now dominated by four companies

Offshore and Ocean Rig. Rowan was noticeably inactive during this restructuring phase, electing to remain on its own until Ensco came bidding. Rowan's last acquisition occurred 15 years ago when then-Chairman Bob Palmer purchased Marathon-LaTourneau, a manufacturing company, which owned the LaTourneau jacking system patent, integral to all the company's jackup drilling rigs.

The current offshore drilling sector is now dominated by four companies – Ensco Rowan, Transocean, Noble Corporation plc (NE-NYSE), and Diamond Offshore Drilling, Inc. (DO-NYSE) - all of whom have been constructed from the fleets of companies no longer existing. Storied names that are gone include: The Offshore Company, CUSS, which became Global Marine, Southeast Drilling Company (Sedco), Dixilyn-Field, Forex, Reading & Bates Drilling, Santa Fe Drilling, Falcon Drilling, Cliffs Drilling, Childs Offshore, Broughton Offshore, the offshore drilling division of Western Company of North America, Aker Drilling, Arethusa, ODECO, and Zapata Offshore Drilling. We probably missed a few.

We were privileged to walk the halls of companies with the giants who created this industry

During our career as an oilfield service investment analyst, an industry consultant and an Ensco employee, we were privileged to walk the halls of companies with the giants who created this industry. This uniquely American industry grew and expanded globally over the decades, surviving numerous business cycles. From the late 1960s through the booming 1970s to the depression of the '80s and '90s and recovery in the early 2000s, the industry survived. It is now exiting the bust from the last boom of the 2010s. It has been quite a ride! As companies disappeared, their demise set the stage for the next up-cycle. It is happening again.

Climate Change Media Is Taken to Task For Lack Of Honesty

Stirring up partisan emotions should be the purview of opinion writers, activists and politicians – not the role of reporters

It is hard to write balanced articles about controversial topics. We see that every day with the media's coverage of political and social "hot-button" topics. Stirring up partisan emotions should be the purview of opinion writers, activists and politicians – not the role of reporters. Unfortunately, reporters increasingly are incorporating opinions in their reporting, and often demonstrating an absence of having done basic research on the topic, such as reading underlying scientific papers. We see this 'crime' committed virtually every day in our reading of the daily newspapers and newsletters we receive.

It makes our blood boil to have to wait until the 12th paragraph of a 14-paragraph news story to find a conflicting opinion or contrary data point to the central tenet of the article. We expect that presentation format from people advocating specific positions, but not from reporters, especially when they demonstrate a lack of knowledge of the topic.

It is appropriate for a speaker to a professional group to be an advocate of his case, but the audience expects him/her to know and

They pointed out that his slides were based on the most extreme climate scenario published by the Intergovernmental Panel on Climate Change (IPCC), which has the lowest confidence of occurring

understand conflicting positions. It is disturbing when that isn't the case. This spring we attended a luncheon talk at the Houston Economics Association given by Jim Krane, the Wallace S. Wilson Fellow for Energy Studies at Rice University's Baker Institute for Public Policy. Mr. Krane is a former Middle East reporter who subsequently obtained a Ph.D. in economics and authored several books and numerous articles on the Middle East oil industry and its politics. In fact, Mr. Krane's talk was based on his latest book, Energy Kingdoms: Oil and Political Survival in the Persian Gulf. (We recommend the book.) After finishing his talk, he mentioned that he had material on climate change and wondered if we wished to hear it. As he launched into his presentation and slides, hands went up from a couple of oil company economists. They pointed out that his slides were based on the most extreme climate scenario published by the Intergovernmental Panel on Climate Change (IPCC), which has the lowest confidence of occurring. Mr. Krane was surprised to learn that and quickly finished his talk in front of a now highly-skeptical audience. Mr. Krane was victimized by the media's coverage of the Fourth National Climate Assessment report release.

A recent column by *Wall Street Journal* business columnist Holman Jenkins addressing the media's corruption of climate policy

This story came to mind after reading a recent column by *Wall Street Journal* business columnist Holman Jenkins addressing the media's corruption of climate policy. He began his column by assessing Joe Biden's climate policy, which Mr. Jenkins found to be more realistic than the Green New Deal embraced by other Democratic presidential candidates. Mr. Jenkins brought up the media's articles following last year's release of the Fourth National Climate Assessment report, in which reporters accepted at face value the claim of how much damage to the U.S. economy climate change will cause, based on the most extreme CO2 emissions scenario. To appreciate the nature of the report, we offer quotes from the summary that characterized the reports' bias.

"However, the assumption that current and future climate conditions will resemble the recent past is no longer valid."
(Page 36)

"However, the unambiguous long-term warming trend in global average temperature over the last century cannot be explained by natural factors alone. Greenhouse gas emissions from human activities are the only factors that can account for the observed warming over the last century; there are no credible alternative human or natural explanations supported by the observational evidence."
(Page 39-40)

"Climate models have proven remarkably accurate in simulating the climate change we have experienced to date, particularly in the past 60 years or so when we have greater confidence in observations." (Page 40)

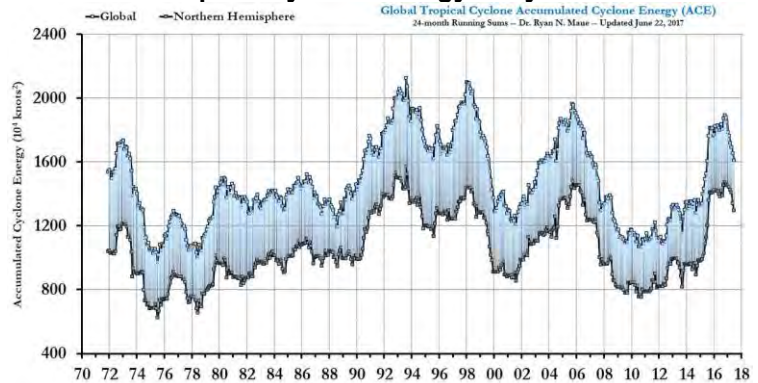
“RCPs [“Representative Concentration Pathways] are numbered according to changes in radiative forcing by 2100 relative to preindustrial conditions: +2.6, +4.5, +6.0, or +8.5 watts per square meter (W/m²). Each RCP leads to a different level of projected global temperature change; higher numbers indicate greater projected temperature change and associated impacts. The higher scenario (RCP8.5) represents a future where annual greenhouse gas emissions increase significantly throughout the 21st century before leveling off by 2100, whereas the other RCPs represent more rapid and substantial mitigation by mid-century, with greater reductions thereafter. Current trends in annual greenhouse gas emissions, globally, are consistent with RCP8.5.” (Page 40)

With more people desiring to live in high-risk coastal and California areas, weather-incidents there will create large damage events

As would be expected, the report pointed to increased wildfires, hurricanes, tornados, and sea levels to demonstrate the growing risk to the U.S. economy and the planet’s environment. There is little doubt that there have been serious storms that have cost lives and inflicted substantial damage. Taken as isolated incidents, they are serious. The damages from these various weather-related incidents, however, should be viewed with caution. With more people desiring to live in high-risk coastal and California areas, weather-incidents there will create large damage events.

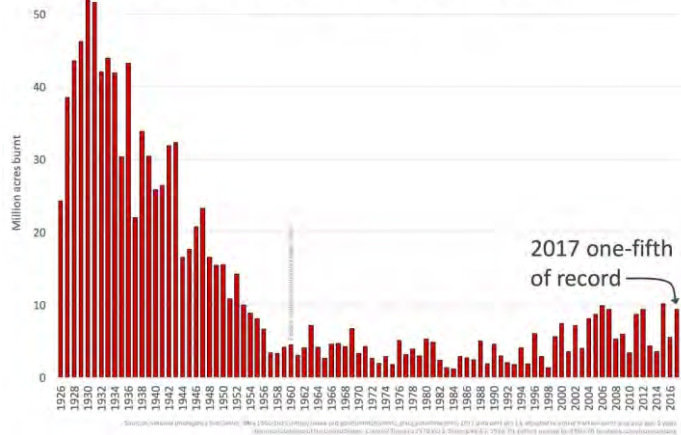
The following charts show the lack of rising trends or rates growing faster than historical norms.

Exhibit 17. Tropical Cyclone Energy Is Cyclical And Lower



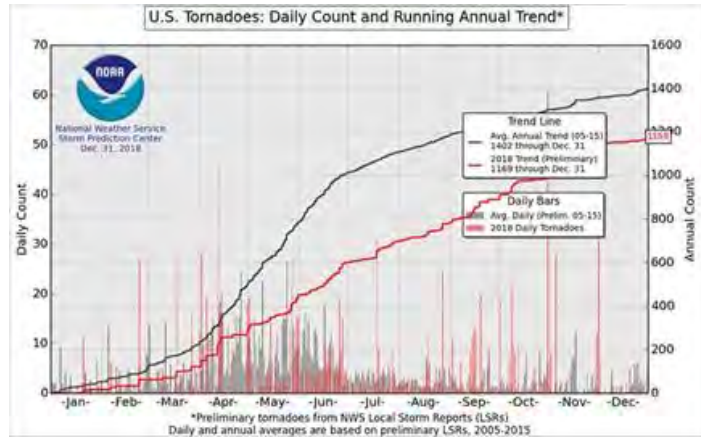
Source: *Science Matters*

**Exhibit 18. While Up Recently, Forest Fires Way Down
US Forest Area Burned 1926-2017**



Source: *Science Matters*

Exhibit 19. 2018 Showed Lower Tornadoes Than History



Source: NOAA

Exhibit 20. U.S. Hurricanes Show Declining Trend

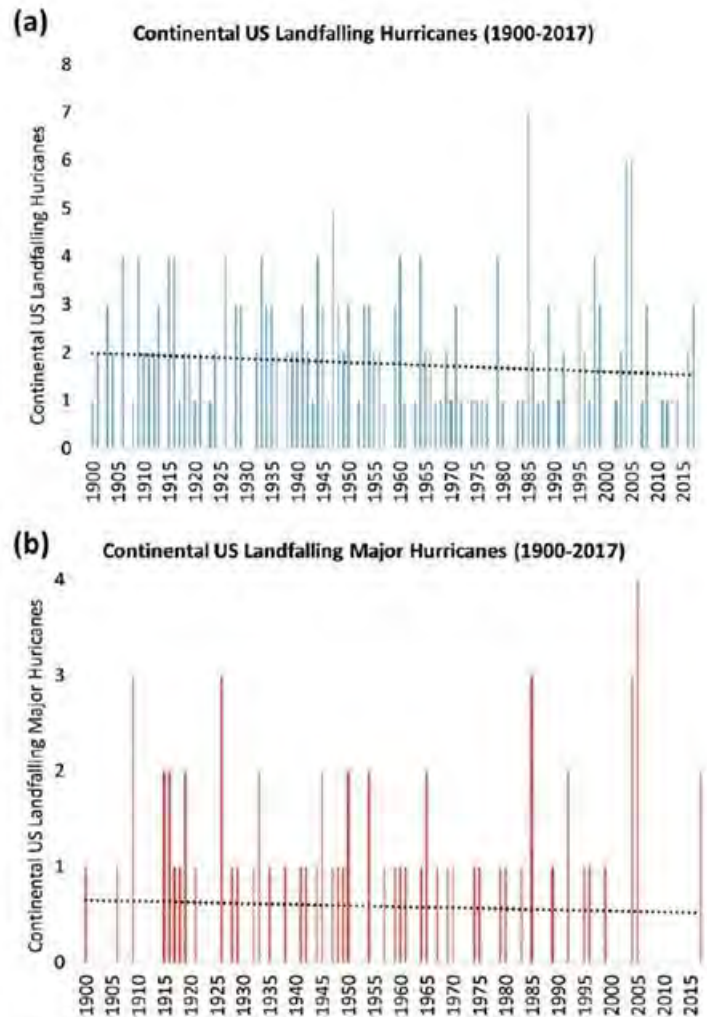


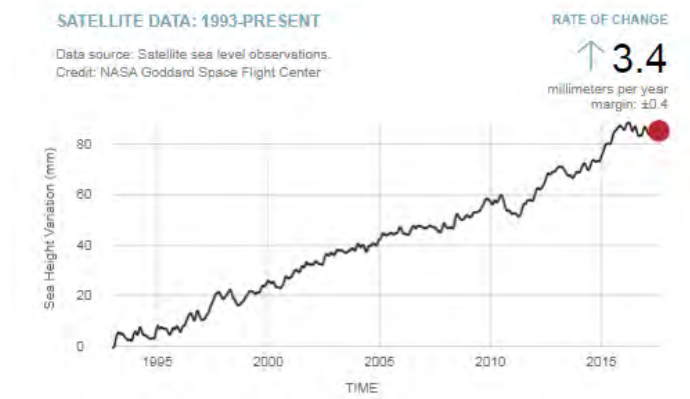
FIG. 2. (a) CONUS landfalling hurricanes by year from 1900 to 2017, and (b) CONUS landfalling major hurricanes by year from 1900 to 2017. The dotted lines represent linear trends over the period. The p values for the linear trends are 0.33 for landfalling hurricanes and 0.61 for landfalling major hurricanes, indicating that neither of these trends are significant.

Source: U. of Colorado

But as the second chart, covering only very recent years, shows, there has been a flattening in sea level increases.

When we shift from weather-related events to sea-level increases, the nature of the presentation changes. Sea levels have been rising for centuries. The issue is at what rate they are rising. Since the early 1990s, the rate of increase has been fairly stable at 3.4 millimeters per year (mm/y). But as the second chart (next page), covering only very recent years, shows, there has been a flattening in sea level increases. Satellite measurements of sea levels only began in 1993, and the timing may have captured a low sea level as its starting point, thereby magnifying the rate of growth.

Exhibit 21. Sea Level Rises Over Different Time Periods



Source: *Science Matters*

Exhibit 22. Sea Levels Are Not Rising As Fast

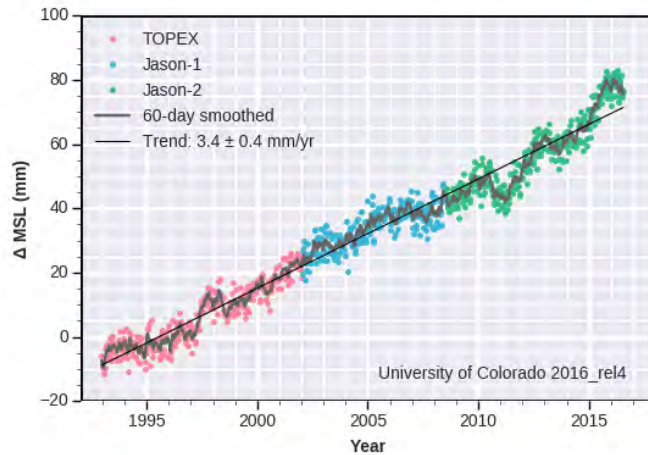


Source: *Science Matters*

Sea level data presented by the University of Colorado (next page) shows a similar steady rise over time, but with wider amplitudes

Sea level data presented by the University of Colorado (next page) shows a similar steady rise over time, but with wider amplitudes. What was most interesting was the second chart (next page) showing smoothed and detrended sea level data plotted against the El Niño Southern Oscillation (ENSO), which is a Pacific Ocean current phenomenon that influences weather patterns across the globe, including the Atlantic basin where it becomes less hospitable for tropical storm and hurricane formation.

Exhibit 23. Sea Level Satellite Measurements Are New

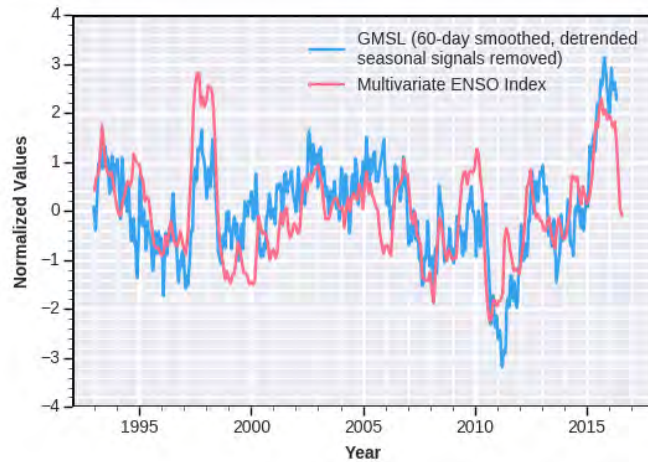


Source: U. of Colorado

The spike in 2015 was marked by a strong El Niño, which coincided with a sharp rise in global sea levels

What the ENSO and sea level chart demonstrates is the very tight relationship between the two data series. The spike in 2015 was marked by a strong El Niño, which coincided with a sharp rise in global sea levels, likely due to warming oceans expanding the water's volume. A similar phenomenon occurred in 1998, which coincided with the peak in global temperatures, as they then moved into a 15-year pause in warming.

Exhibit 24. How Sea Levels And El Niño Move Together



Source: U. of Colorado

The media focused on the estimates of \$500 billion a year cost to the American economy by 2090

Although a range of climate assessments is presented in the summary report, the report's authors embrace the highest scenario for its damage assessment. As Mr. Jenkins pointed out, the media focused on the estimates of \$500 billion a year cost to the American economy by 2090. As he correctly noted, there was no relevancy

The economy’s annual cost from climate change, as postulated by the Fourth National Climate Assessment, represents 0.008% of the estimated U.S. GDP in 2090

presented for the cost to the economy. Based on data and forecasts from the Organization of Economic Development (OECD), by 2060, the U.S. economy is estimated to grow to \$38.974 trillion measured in 2015 dollars. If we extrapolate the growth rate the OECD economists used, by 2090, we estimate the economy will reach \$60,838 trillion. The economy’s annual cost from climate change, as postulated by the Fourth National Climate Assessment, represents 0.008% of the estimated U.S. GDP in 2090. The Assessment stated that the U.S. economy could be 10% smaller in 2090 if climate change is not addressed. Recalculating the economic cost increases the impact to 0.009%.

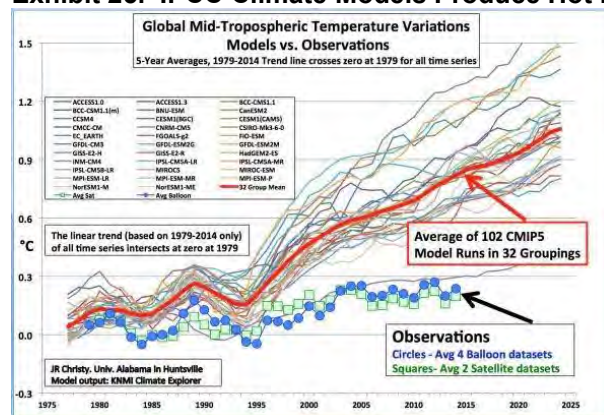
Only one model had accurately replicated the past climate

In talking about the climate models, Mr. Jenkins mentioned that only one model had accurately replicated the past climate. The model belongs to the Institute of Numerical Mathematics of the Russian Academy of Sciences in Moscow (Institute). We are familiar with it, as well as the work of other mathematicians, especially the French, who have done excellent work on understanding and predicting the climate. Mr. Jenkins’ article caused us to revisit the Institute’s model’s performance.

Thereafter, temperature predictions increased dramatically, although real temperatures increased only marginally

We have previously published charts showing IPCC climate model forecasts compared to observations, such as in Exhibit X. The chart was prepared by John Christy, a climate scientist at the University of Alabama in Huntsville. The red line shows the average of temperatures from 102 climate model runs in 32 groupings plotted against actual balloon and satellite temperature observations. What we see is that the shape of the predictions was similar to the actual observations from the mid-1970s to 1995. Thereafter, temperature predictions increased dramatically, although real temperatures increased only marginally.

Exhibit 25. IPCC Climate Models Produce Hot Forecasts



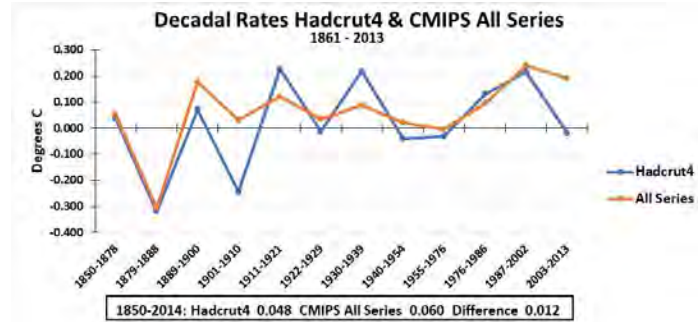
Source: *Science Matters*

When we examined an article evaluating the Institute’s climate model performance versus a group of 42 models in replicating the past, there is an amazing difference. The following three charts

The Institute's climate model forecasted temperatures that differed from the observational data by 4-thousands of a degree,

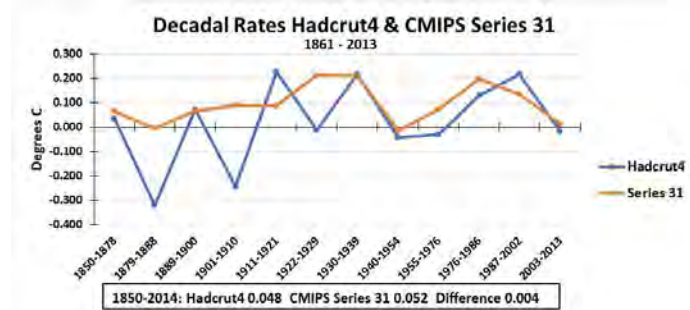
covering 1861-2013 show: 1) observational data (Hadcrut4) versus all the climate models (CMIPS All Series); 2) observational data versus the Institute's climate model (CMIPS Series 31); and 3) observational data, all climate models and the Institute's model. For the first two charts, we presented the decadal rate for 1850-2014 and difference between the observational data and the respective series plotted. What we see is that the Institute's climate model forecasted temperatures that differed from the observational data by 4-thousands of a degree, while the all climate model series' difference was 12-hundredths, in effect three times greater.

Exhibit 26. IPCC Models Vs Observations



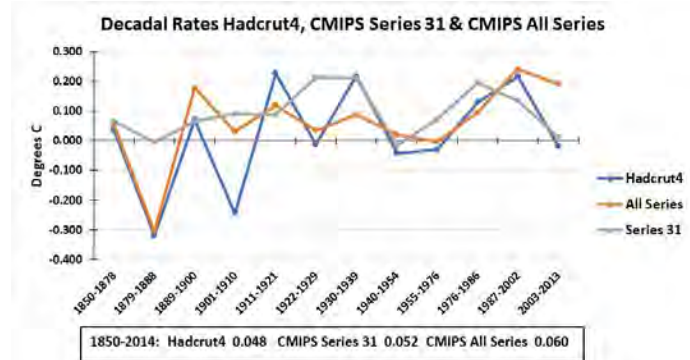
Source: Science Matters

Exhibit 27. Institute Climate Model Vs. Observations



Source: Science Matters

Exhibit 28. Institute Has Most Accurate Climate Model

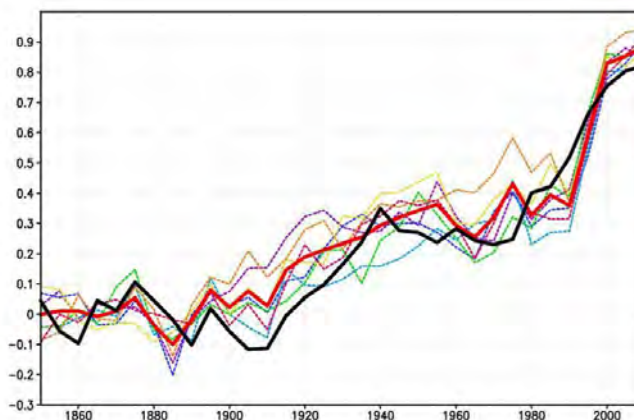


Source: Science Matters

Note how similar the model runs are to the actual data, but also how they deviated at times

The Institute's model has been tested with multiple runs employing seven different climate data. "Time series of CO₂, CH₄, N₂O, O₃, stratospheric volcanic sulfate aerosol concentration, total solar irradiance (TSI), and solar spectrum, as well as anthropogenic emissions of SO₂, black carbon, and organic carbon were prescribed," and used to generate a model of historical temperatures. The results from this exercise were reported on in the paper "Simulation of observed climate changes in 1850–2014 with climate model INM-CM5" published by Earth Systems Dynamics in October 2018. The authors, Evgeny Volodin and Andrey Gritsun, are with the Institute. Exhibit 29 shows the results of the seven model runs against the observational data (black line). Note how similar the model runs are to the actual data, but also how they deviated at times. Each model run, driven by specific data, was analyzed and conclusions drawn and recommendations made for improving future outcomes.

Exhibit 29. Seven Models Closely Match Observations



Source: Institute of Numerical Mathematics

In an attempt to avoid creating a detailed climate modeling article, the primary conclusion of the analysis was:

"Seven historical runs for 1850–2014 with the climate model INM-CM5 were analyzed. It is shown that the magnitude of the GMST [global mean sea-surface temperature] rise in model runs agrees with the estimate based on the observations. All model runs reproduce the stabilization of GMST in 1950–1970, fast warming in 1980–2000, and a second GMST stabilization in 2000–2014, suggesting that the major factor for predicting GMST evolution is the external forcing rather than system internal variability."

A key conclusion from an analysis of the failure of certain models to accurately replicate the GMST was that the use of 'an additional model run with anthropogenic aerosol emissions fixed at the level of year 1850 shows a gradual GMST rise in 1950–1970 together with

Projected into the future, the Institute’s model projects an unalarming temperature increase to 2100 of 1.4C (2.52 F)

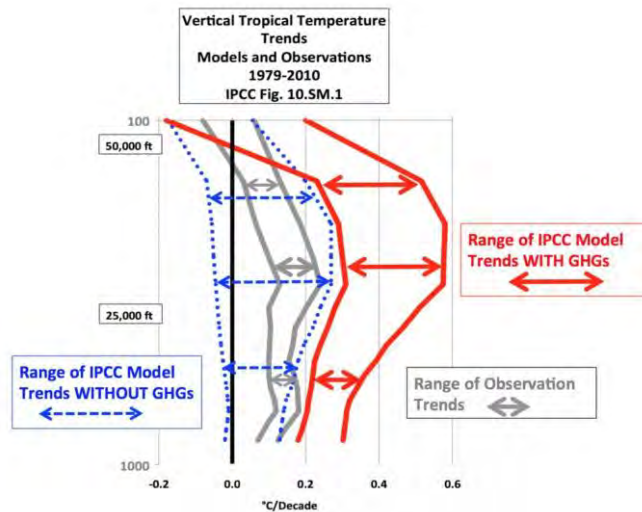
Without CO2, the models come much closer to replicating temperature history

its stabilization in 2000–2014 (not shown). The latter fact supports the hypothesis that correct reproduction of GMST changes in 2000–2014 is due to the corrected CMIP6 treatment of the TSI [total solar incidence].”

What is most important about the Institute’s climate model was its near perfect replication of the temperature history of 1861-2013. Projected into the future, the Institute’s model projects an unalarming temperature increase to 2100 of 1.4C (2.52 F). Note that the Institute’s projection falls below the 1.5C increase environmentalists say is necessary to keep the planet from self-destruction. That target can be met without upending our entire economic system and how it is powered.

The Institute’s temperature forecast is well below those produced from the climate models utilized by the IPCC, which in some cases are as much as five times greater. The criticism of climate models is that they are biased to the warm side. An interesting chart shows the temperatures from climate models attempting to recreate actual temperatures at various elevations of the atmosphere for 1979-2010. The chart shows that the models always exceed the actual observations when they rely on CO2 as the forcing mechanism. Without CO2, the models come much closer to replicating temperature history, demonstrating the warming bias of the carbon emissions thesis.

Exhibit 30. How IPCC Climate Models Are Biased



Source: IPCC

This goes against the preconceived basis for founding the IPCC, and weakens the attack on fossil fuels

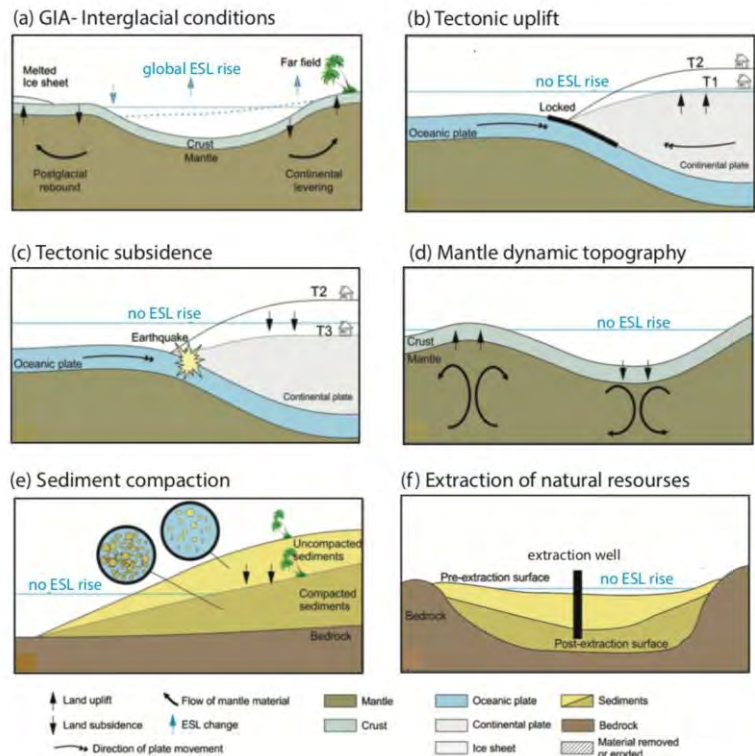
Understanding that natural variables are more important in explaining our temperature history is important since such a climate model projects a smaller temperature increase. This goes against the preconceived basis for founding the IPCC, and weakens the attack on fossil fuels. The Institute’s climate model results suggest

The lower temperature projection from the Institute’s climate model is also key to questioning the fears of danger from rising sea levels

that adaptive steps, more fuel-efficient vehicles, equipment and appliances, as well as increased use of cleaner fossil fuels could be a more palatable and less costly route for the global economy than draconian plans such as the Green New Deal.

The lower temperature projection from the Institute’s climate model is also key to questioning the fears of danger from rising sea levels. A recent article in *The New York Times* dealing with rising sea levels and preservation efforts for colonial homes at the Point in Newport, Rhode Island, highlights how climate change is tied to sea levels. The reporter wrote; “The Point sits only a few feet above sea level, and because of climate change, the ocean is rising.” Oceans have been rising, and also falling, for thousands of years, long before rising CO2 levels in the atmosphere due to the Industrial Revolution’ burning of fossil fuels were thought to be an issue.

Exhibit 31. The Sources Of Local Sea Level Rises



Source: Dr. Curry

Judith Curry, a well-regarded climate scientist and now the President of Climate Forecast Applications Network, published a special report on “Sea Level and Climate Change” in November 2018. The 79-page report examined the issue of how sea level changes are measured and what climatic and natural forces may influence sea level changes over time. For most people, the issue is sea level changes where they reside, which may be going up or down, and

not related to overall sea level changes. These local sea level changes are generally related to the relative movement of the land and its impact on tidal gauges. A schematic used in the report demonstrates the natural forces influencing sea level movement.

With the exception of changes in the glacial ice sheets, the land movements in Exhibit 31 (prior page) should have little impact on sea level changes. As part of the study, Dr. Curry examined land movement data for nine cities (three each from the Pacific, Gulf and East Coasts) that impact relative sea level movement. The data was taken from various regional studies, noted in Exhibit 32.

Exhibit 32. Subsidence At Coastal Ports

Table 6.1. Estimates of Vertical Land Motion from continuous GPS (mm/year).

	Pacific coast ^a	Gulf Coast ^b	Atlantic coast ^c
Seattle	-1.10 ± 0.90a		
San Francisco	-1.44 ± 0.50a		
San Diego, CA	-3.00 ± 0.20a		
Galveston, TX		-4.70 ± 0.4	
Grand Isle, LA		-7.10 ± 0.4	
St Petersburg, FL		-0.50 ± 0.4	
Providence, RI			-0.63 ± 0.09
New York, NY			-1.32 ± 0.30
Baltimore, MD			-1.39 ± 0.19

^a NAS (2012)
^b Letetrel et al. (2015)
^c Karegar et al. (2016)

Source: Dr. Curry

When the glaciers melted, the reduction of that weight allowed the land underneath to expand

It is important to understand that land movement impacts the perception of sea level changes. Earth models developed to predict postglacial rebound have enabled the prediction of vertical land motion at rough spatial scales. We know that when the glaciers melted, the reduction of that weight allowed the land underneath to expand. In many cases this expansion is still underway in areas where the glaciers were last located. That doesn't explain other forces influencing land motion at relatively short time spans. Dr. Curry stated:

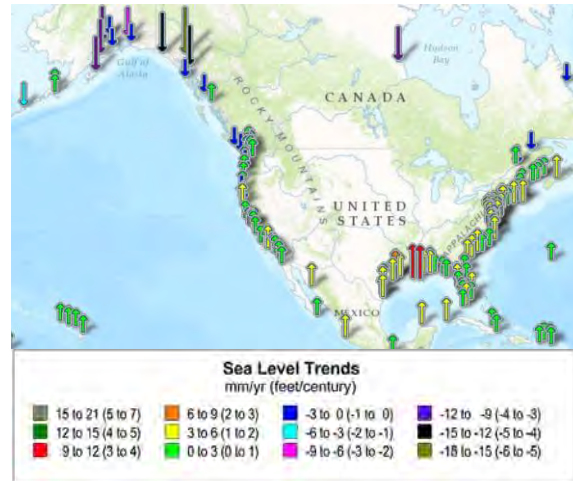
“Local vertical land motion of relevance to local sea level change is best measured using a Global Positioning System (GPS) station. GPS began to be used to adjust tide gauge data for vertical land motion around 1997. Data sets of continuous GPS observations are still relatively short compared to tide gauge records, and there are many tide gauges that do not have collocated GPS. This introduces an additional source of uncertainty as to how representative the GPS estimates of recent vertical land motion are of long-term land motion at tide gauges. The working hypothesis is that vertical land motion occurred at a steady rate over the decades to century timescales in which the tide gauge was operational and that it is continuing at the same steady rate over the GPS period. This issue becomes a concern especially for areas affected by geologic processes or local ground deformation such as settling of landfill or underground fluid extraction.”

A 2017 report by the U.S. Geologic Survey noted that by 1979, Houston had already experienced 10 feet of subsidence due to groundwater withdrawal

Those of us on the Gulf Coast are familiar with subsidence due to the withdrawal of oil and gas, and water. Forty years ago, concern in Houston over subsidence due to tapping aquifers led to creation of reservoirs north of the city. A 2017 report by the U.S. Geologic Survey noted that by 1979, Houston had already experienced 10 feet of subsidence due to groundwater withdrawal. The report also noted that the compaction of the soil cannot be reversed even if groundwater levels increase. The subsidence would remain.

In a government map showing local coastal sea level rises, the two most extreme increases are for Gulf Coast locations – Galveston, Texas and Grand Isle, Louisiana. Note also that locations in Canada and Alaska have experienced sea level declines, highlighting how regional factors influence sea levels.

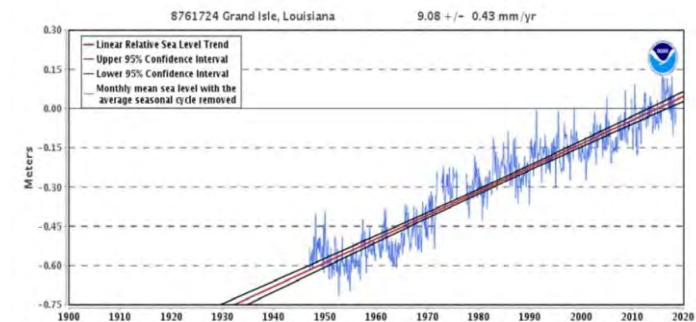
Exhibit 33. How Local Sea Level Rises Differ



Source: Dr. Curry

The most dramatic sea level increase is being experienced at Grand Isle. The slope of the rate of sea level rise is certainly dramatic, but it has little to do with climate change.

Exhibit 34. Sea Levels At Grand Isle Over Time



Source: NOAA

A 2015 study found that vertical land movement (subsidence) was -7.01 mm/y, or -2 1/3 feet over the last 100 years

Since 1950, the sediment carried by the Mississippi River to the delta has fallen by about 50%, primarily due to the construction of dams in the Mississippi basin to control flooding

These refugees might more accurately be called “Great Mississippi Flood mitigation refugees”

Lower Manhattan has been expanded over centuries that proved to be a problem when Hurricane Sandy’s tidal surge arrived in October 2012

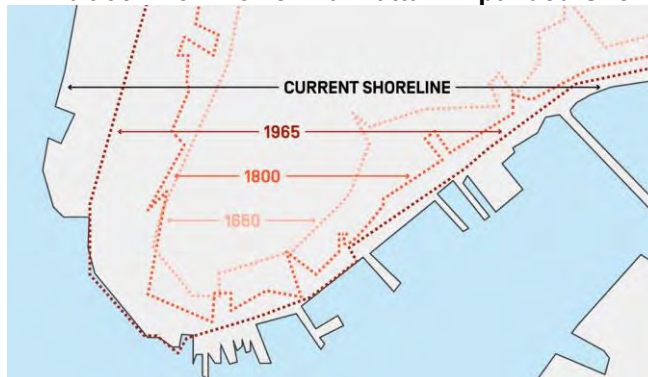
At Grand Isle, tide gauges show sea levels having risen almost three feet over the last 100 years, or an average rate of increase of 9.08 millimeters per year (mm/y). Similarly, a 2015 study found that vertical land movement (subsidence) was -7.01 mm/y, or -2 1/3 feet over the last 100 years. That means the absolute sea level rise has averaged 1.98 mm/y, or about eight inches over the last 100 years.

Anyone who has spent time in South Louisiana and the Mississippi delta knows that sea levels and land-loss issues are complex. Geological subsidence and the decline in the sediment transported by the Mississippi River are the primary drivers of sea level increases. Since 1950, the sediment carried by the Mississippi River to the delta has fallen by about 50%, primarily due to the construction of dams in the Mississippi basin to control flooding. In 2017, a study of the new subsidence map of coastal Louisiana showed how the region was sinking at about a third-of-an-inch per year. For New Orleans, whose elevation averages one to two feet below sea level, this reality is daunting.

Dr. Curry commented about the “climate refugees” from Isle de Jean Charles off the coast of Louisiana. Since 1955, the island has shrunk from 22,000 acres to only 320, today. The principal problem relates to the U.S. Army Corps of Engineers decision to build giant levees to control the Mississippi River following the disastrous flood in 1927. It reduced the flow of sediment to the area. As a result, what had provided for the sustainability of the island is gone. Therefore, these refugees might more accurately be called “Great Mississippi Flood mitigation refugees.”

This is an example where public policy for dealing with natural forces for the benefit of one group often creates problems for others. Filling in marshes to expand towns and cities alters the natural flow of water, which may prove extremely disruptive later when storms hit. For example, lower Manhattan has been expanded over centuries that proved to be a problem when Hurricane Sandy’s tidal surge arrived in October 2012.

Exhibit 35. How Lower Manhattan Expanded Over Time



Source: Lower Manhattan Coastal Resiliency

Much of the Manhattan Island areas along the East and Hudson Rivers have been expanded with fill allowing increased commerce and transportation

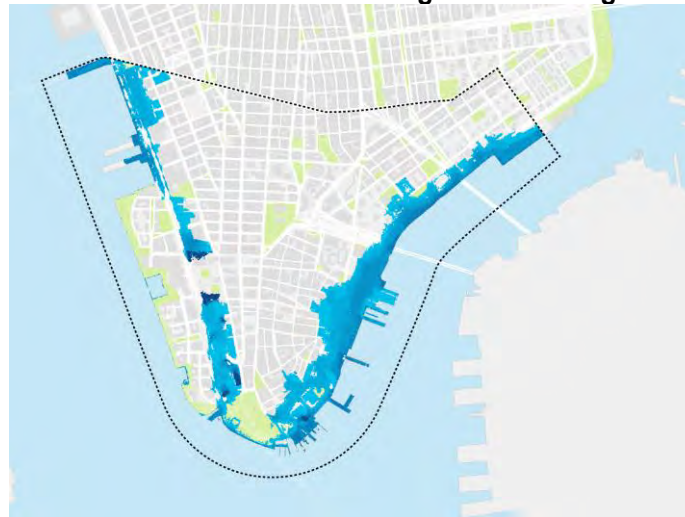
The map showing the evolution of the shoreline for the lower part of Manhattan Island highlights the problems from filling in the ocean to address increasing population and commercial interests. Much of the Manhattan Island areas along the East and Hudson Rivers have been expanded with fill allowing increased commerce and transportation. A March 2019 report from the Lower Manhattan Coastal Resiliency project showed two charts of Lower Manhattan highlighting the challenge the city faces in preparing for climate change impacts. One chart showed the flooding caused by Hurricane Sandy, while the other projected hightide flooding in 2100 after climate change is projected to have elevated tides by four feet.

Exhibit 36. Flooding Due To Hurricane Sandy In 2012



Source: Lower Manhattan Coastal Resiliency

Exhibit 37. Manhattan’s Flooding In 2100 At High Tide



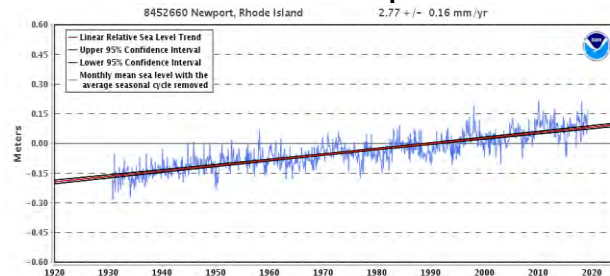
Source: Lower Manhattan Coastal Resiliency

In both cases, substantially all the flooding was/is in areas New York City has reclaimed from the sea years ago.

If we assume that Newport’s land subsidence is similar to Providence, then the city’s sea level increase would be 2.14 mm/y, or slightly more than 8 inches over the past 100 years

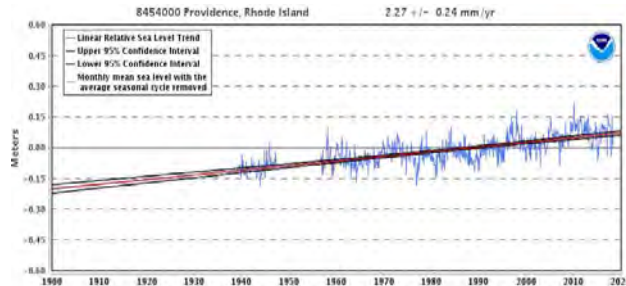
It appears Newport has similar challenges as New York City. Newport’s sea level has been rising 2.77 mm/y, or about 11 inches over the past 100 years, while that at neighboring Providence has increased at 2.27 mm/y, or nine inches/100 years. The vertical land movement (subsidence) at Providence was -0.63 mm/y (-2.5 inches/100 years), making the net sea level rise 1.64 mm/y (6.5 inches/100 years). If we assume that Newport’s land subsidence is similar to Providence, then the city’s sea level increase would be 2.14 mm/y, or slightly more than 8 inches over the past 100 years.

Exhibit 38. Sea Levels At Newport Over Time



Source: NOAA

Exhibit 39. Sea Levels At Providence Over Time



Source: NOAA

We learned some interesting history about the Point from the *NYTimes* article.

“The Point was settled in the 17th century by Quaker refugees from Massachusetts. Then, it was little more than a spit of land sticking out into what became Newport Harbor. Soon, as its edges were filled in, a marsh became Marsh Street, and a wet area became Water Street; the path of a span that once linked the Point to the rest of Newport turned into Bridge Street.”

The concern about the restored colonial homes in the Point being at risk from rising sea levels is likely more due to its historical development than climate change. We would venture to guess that this article will be included as evidence in the Rhode Island lawsuit against Chevron Corp. (CVX-NYSE) over its cover up of climate change’s impact on the state.

The number of Rhode Islanders at risk of flooding equals 0.007% of the state's population in 2018

What we found interesting in Dr. Curry's discussion of Newport and Providence was her reference to the R.I. Statewide Planning report. We cited this report earlier when we wrote about the Chevron/R.I. climate change lawsuit.

The planning report noted that approximately 7,000 people live within the 7-foot sea level rise inundation zone, which would occur only if the worst CO2 emissions case the IPCC forecasts actually happens. That is the scenario the IPCC says has little chance of happening. The number of Rhode Islanders at risk of flooding equals 0.007% of the state's population in 2018. More important is what the report said about the risk due to the sea level rise:

"Nonetheless, it is clear that the current circumstances in Rhode Island can be viewed with optimistic caution. Though sea level rise and storm surge are likely to present clear difficulties in many areas, it should be recognized that the threats being faced are not entirely new: previous generations also faced inundation from major storm events, and as a result many key assets in Rhode Island are either well protected, or have not survived the state's 380 year history. Most major transportation systems are located well away from flood zones, and some population centers have built up systems of flood defense. As a result, the vulnerabilities described in these projects are not of an existential nature."

Because these projections are pegged to the IPCC's worst case emissions scenarios, it would be interesting to see what happens to the conclusions if the Institute's climate model's results were utilized instead

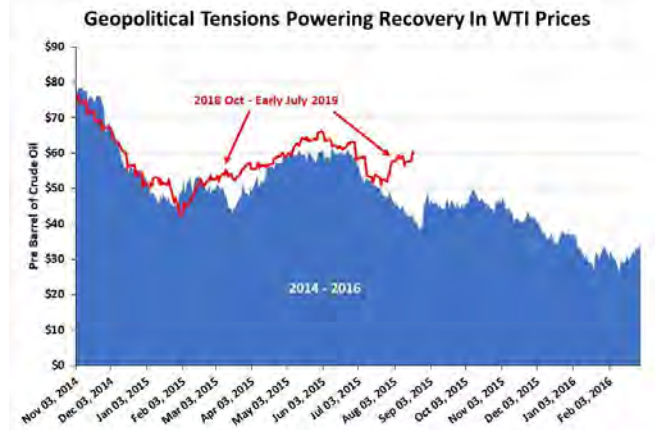
In other words, the risk to the 7,000 Rhode Islanders is not their complete disappearance due to a flood caused by the worst-case climate change scenario. That is quite a conclusion from a government body in a state that seeks to emulate California with respect to energy, climate change and social attitudes. Because these projections are pegged to the IPCC's worst case emissions scenarios, it would be interesting to see what happens to the conclusions if the Institute's climate model's results were utilized instead. This is critical since temperature projections drive virtually all the climate change prognostications. We expect Dr. Curry's report to be a focal point when she testifies before Congress on climate change later this summer.

Oil Prices On The March Despite Demand Challenges

Add in the emergence of Tropical Storm Barry in the Gulf of Mexico shutting off one million barrels a day of oil flow, and you have WTI up nearly \$4 per barrel, or 7% between July 3 and July 11

The past two weeks have witnessed significant crude oil and gasoline inventory reductions that have helped to lift West Texas Intermediate (WTI) prices. It hasn't hurt that tensions in the Middle East due to Iranian threats against oil tanker traffic have escalated, especially following the seizure by British authorities of an Iranian tanker hauling sanctioned Iranian crude oil bound for Syria. Add in the emergence of Tropical Storm Barry in the Gulf of Mexico shutting off one million barrels a day of oil flow, and you have WTI up nearly \$4 per barrel, or 7% between July 3 and July 11.

Exhibit 40. How Oil Prices Are Tracking 2014-2016



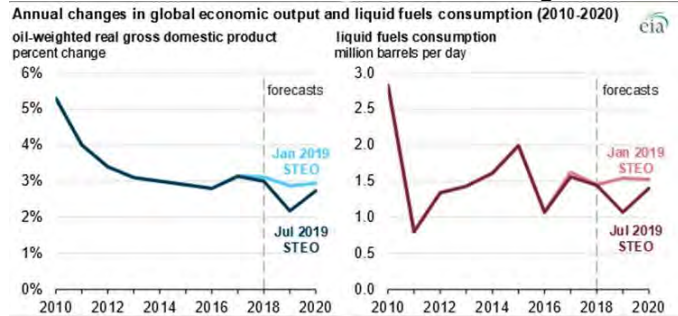
Source: EIA, PPHB

OPEC’s decision to formalize its working relationship with Russia and its allies to sustain the current agreement to cut combined oil output by 1.2 million barrels per day for an additional nine months generated positive sentiment for oil prices. Although some OPEC producers had wanted a larger cut, the longer agreement extension mollified their concerns.

OPEC+ will need to keep its output under tight control for longer than maybe some people anticipated

Saudi Arabian Energy Minister Khalid Al-Falih said he is “enthusiastic about where oil demand is going.” With OPEC and Russia having formalize its new working relationship, it is now focusing on a new measure of stockpiles for governing output. Instead of relying on the current 5-year average for inventories, it is considering using inventories for 2010-2014, which puts the world’s surplus at 240 million barrels rather than 25 million. That suggests OPEC+ will need to keep its output under tight control for longer than maybe some people anticipated.

Exhibit 41. Demand Forecasts Are Coming Down



Source: EIA

While OPEC+ was optimistic about the health of the oil market at the meeting, Iran’s Oil Minister suggested it may need to cut output further as it continues to lose market share to U.S. shale oil. His statement proved prescient as the July OPEC Monthly Oil Report cut

Forecasters have less confidence in their demand forecasts given the trade wars underway and data suggesting global economies slowing

non-OPEC production this year, but lowered global oil demand growth in 2020, likely requiring either a greater production cut or one extending longer in 2020. OPEC had previously reduced its 2019 demand forecast.

At the same time, the latest Short Term Energy Outlook (STEO) from the Energy Information Administration (EIA) has cut its 2019 domestic demand for 2019 and reduced it slightly for 2020. This is a sign that forecasters have less confidence in their demand forecasts given the trade wars underway and data suggesting global economies slowing. It is easier tracking global oil output, but demand estimates are more elusive. Demand is complicated because changes in inventories are more difficult to track. Are we facing a market imbalance as existed in the second half of 2016?

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