PPHB
ENERGY INVESTMENT BANKING

# MUSINGS FROM THE OIL PATCH

**May 19, 2020**

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**Managing Director**

**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:

### Good-bye, April. Hello, Uncertainty.

The economic data for April was devastating, showing how much our citizens have suffered from Covid-19 and the economic shutdown. A long-term forecast shows lower productivity growth translating into slower economic growth. Coupled with structural economic changes, it means less energy use and challenges for the business.

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### Plug-ins: 1 in 40 New Car Sales; Where's The EV Revolution?

Electric vehicles are selling relatively well, but still represent only 2.5% of new car sales. We continue to await the EV revolution, but battery costs remain stubbornly high, raising the issue of potential business model changes on the horizon for automakers. Welcome to the world of raw material mining as a way to lower costs?

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### Are The Next Climate Change Cases Going Off The Rails?

The global economic shutdown has sparked an effort to build climate change policies into the recovery plans various governments are formulating. The legal battles between environmentalists and oil and gas companies rage on, but new information shows the true motivation, which is to seek funds to support their climate battle.

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# Good-bye, April. Hello, Uncertainty.

Based on all indications, April may have been the worst month for oil demand destruction, with estimates that upwards of 30 million barrels a day (mmb/d) of consumption evaporated during the month. That represented 30% of estimated global oil demand. But it should not have been a surprise given that cars didn't drive, planes didn't fly, and ships didn't sail. Without them, who needs oil?

**The pace of the demand recovery will really depend on the pace of the economy reopening**

Although May's demand loss will be smaller than April's, giving a perception of a V-shaped recovery, the pace of the demand recovery will really depend on the pace of the economy reopening. For example, it won't be until fall before schools in the U.S. return to session, although we are already learning of some universities planning to conduct fall classes online. We don't know how many more may make that move.

While more people will begin flying, it doesn't mean the number of planes in the air will grow. We only are confident that plane load factors (number of passengers) will increase. Although a substantial volume of gasoline consumption supports daily commuting, that consumption will be hurt by more people working from home, but helped by the number of former mass transit riders who opt to drive themselves to work rather than risk infection from riding in packed buses or subway cars.

**Near-Term Oil Market Considerations**

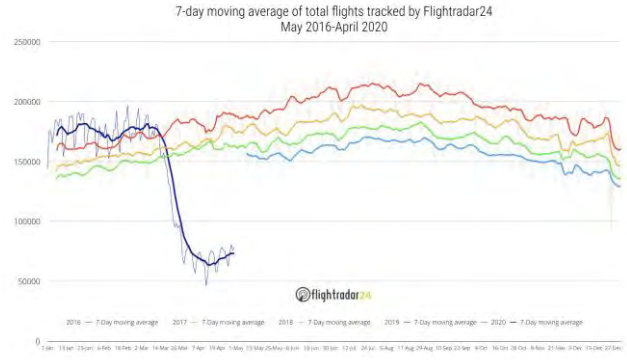
**Even with more efficient airplanes, it was clear that the growth in the number of flights would drive increased jet fuel consumption**

To better appreciate that April was the worst month for oil demand, and that May is showing improvement, a few charts are in order. Exhibit 1 (next page) shows a 7-day moving average of total airplane flights from May 2016 to April 2020. While most observers will focus on the collapse of flight activity this year and the early signs of recovery, we were struck by the consistent year-over-year growth in flights from 2016 to early 2020. Even with more efficient airplanes, it was clear that the growth in the number of flights would drive increased jet fuel consumption. Now, with fewer flights and significantly less jet fuel demand, we wonder how quickly, and by how much, flight activity will recover?

To put the significance of the air transportation recovery into perspective, global jet fuel demand represents about 8% of total world oil use, or roughly 7.5+ million barrels per day (mmb/d). From early February to early March, the number of air flights fell 48%, according to *flightradar24.com*. As flight activity has been growing, *Statista.com* reports jet fuel consumption had increased between 2014 and 2018 at faster than 5% per year. Preliminary data for 2019 shows growth of only a little more than 1%, which appears to be low given the number of flights in 2019 as shown in Exhibit 1. That 2019 fuel consumption figure is preliminary, which we suspect will be revised higher when all international fuel data is compiled. As

airlines announce plans to downsize their future operations, including a handful actually shutting down, jet fuel consumption will suffer. Most of the airlines shutting down vow to return to service once they reorganize their balance sheets. However, to be financially viable, they will likely fly fewer planes, more fuel-efficient ones, and to fewer locations. Thus, it is easy to project a 25% reduction in flights, which translates into possibly 2 mmb/d of lost jet fuel demand.

**Exhibit 1. How Flights Dropped, But Are Now Recovering**

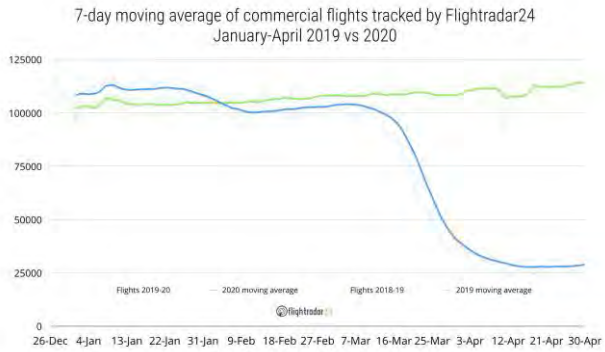



**Source:** ***flightradar24.com***

**The number of commercial flights dropped below the year-before total in the latter days of January 2020**

We can see what happened to air transportation during the first four months of 2019 and 2020, which highlights the dramatic decline in flights. Interestingly, the number of commercial flights dropped below the year-before total in the latter days of January 2020. That was largely reflective of the sharp drop in domestic flights within China, and international flights originating there.

**Exhibit 2. February 2020 Flights Were Already Declining**



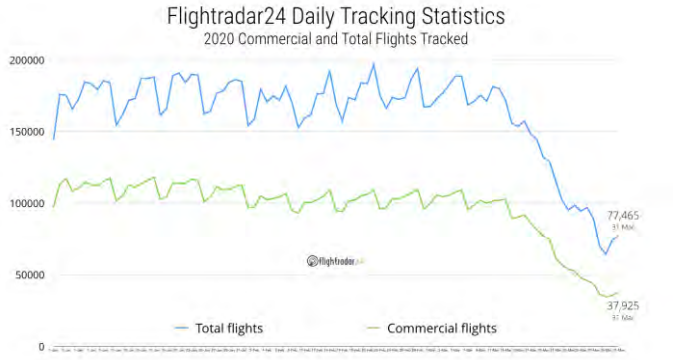

**Source:** ***flightradar24.com***

A chart showing total and commercial flights through the end of March presented an interesting perspective on the air transportation market. What the chart shows is that the decline in total flights was sharper than the decline in commercial flights. Why did that occur?

**Total commercial flights in April 2020 were 29,439 compared to 111,799 a year ago**

*Flightradar24.com* defines the two flight categories thusly: "Commercial flights represent all commercial passenger flights, cargo flights, charter flights, and some business jet flights. Total flights represented all of the commercial flights listed above, plus the rest of the business jet flights, private air flights, gliders, most helicopter flights, most ambulance flights, government flights, some military flights and drones." We were struck by the inclusion of gliders and drones, neither of which are powered by jet fuel, but which do impact air traffic. We doubt they amount to very many of the total flights. It is important to note that total commercial flights in April 2020 were 29,439 compared to 111,799 a year ago.

**Exhibit 3. How We Count Total Flights In U.S.**




**Source:** ***flightradar24.com***

**Blocking center seats for other than family members seems unworkable, as the economics of airlines requires passenger occupancy ratios of 75% or greater, in order to be profitable**

How many people will be quick to jump on airplanes, even with social distancing measures? Will those measures consist of only requiring everyone onboard to wear a mask? Blocking center seats for other than family members seems unworkable, as the economics of airlines requires passenger occupancy ratios of 75% or greater, in order to be profitable. Of course, the airlines could raise airfares, which would alter their marketing strategy calling for cheap fares and high passenger volumes. The International Air Transportation Association (IATA) estimates that to offset the lost seats in such a restricted seating arrangement would mean a radical change in airline business models, a possibility, but probably not likely.

Airlines are talking about reducing crew and passenger interaction, which, so far, seems to mean cutting the meager services provided – snacks, beverages and occasional meals. This will return the passenger flying experience to what existed some years ago, and which generated significant consumer dissatisfaction.

Recently, we saw a proposed seating arrangement where the middle seat was reversed. Other than private planes or first class on some airlines, Southwest Airlines (LUV-NYSE) was the only airline we remember having rows of seats facing backwards. The six seats facing each other made for a great lounge-like arrangement for groups traveling together. According to our research, they are

**Exhibit 4. Is This The Future For Airplane Seating?**

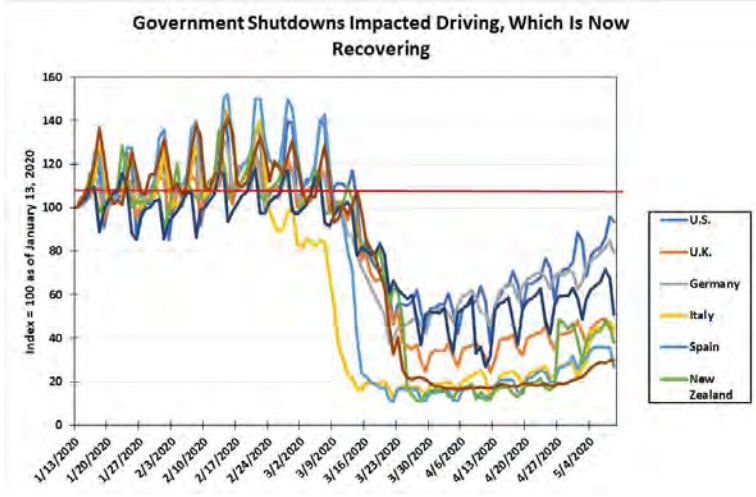
**Source:** ***Business Insider***

**They are "out of the norm" expected by passengers, plus they can prove uncomfortable when passengers wind up staring at each other**

unpopular since they are "out of the norm" expected by passengers, plus they can prove uncomfortable when passengers wind up staring at each other. According to one article, while the seats are actually safer in the event of a crash, the higher center of gravity of the backward-facing passenger strains the seat, meaning it requires increased strengthening of the cabin floor, adding cost and weight to planes, which impacts fuel consumption and airline economics.

Driving is another fuel consumer that is beginning to stage a recovery after the global economic shutdown. Apple Mobility data plotted since January 13 to early May for various countries, shows the demand destruction and the ongoing recoveries. It is interesting to note how the timing of shutdowns impacted driving, as well as their end is contributing to the recoveries. Clearly, not every country is experiencing recoveries at the same pace.

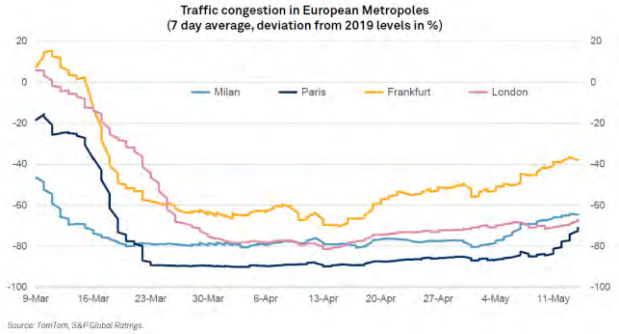
**Exhibit 5. Traffic Recovery Is Still Uneven But Rising**




**Source: Apple Mobility, PPHB**

Some other data shows how driving, measured by congestion data, has impacted four major European cities. These cities show similar mixed demand destruction timing and recoveries.

**Exhibit 6. How European City Traffic Is Recovering**




**Source: S&P Global**

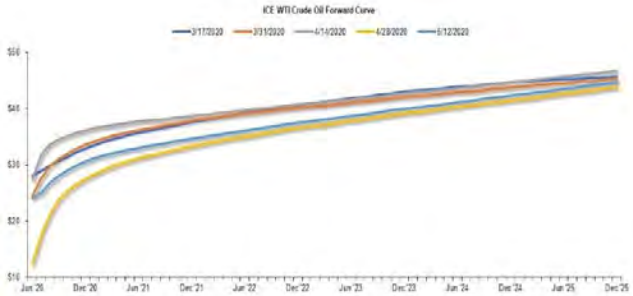
**In the past several weeks, we have learned that U.S. production is falling much faster than anticipated**

The current oil demand recovery trends, coupled with news of Saudi Arabia's price increases for customers in Asia and Europe, as well as newly-announced plans to cutback output further than previously announced, are supporting the recovery in oil prices. The surge in global oil supply simultaneously with the great demand destruction was leading to a rapid filling of available storage tanks. Fear that global storage would become full is what drove oil prices down. They ultimately fell to a negative price. Fear of full storage also caused pipelines and refiners to cease buying producers' oil output. The collapse in oil prices, even to a one-day hugely negative price, has forced producers to shut in producing wells. In the past several weeks, we have learned that U.S. production is falling much faster than anticipated.

**The higher oil futures price is beginning to change producer actions**

While oil prices recovered sharply after the day of negative futures pricing, the news of faster well shutdowns helped boost the price, as traders saw the prospect of a faster rebalancing of global oil markets. Current crude oil futures prices point to that rebalancing within traders' time horizons. Unfortunately, the higher oil futures price is beginning to change producer actions. A report from a major pipeline company last week said that some producers were reactivating previously shut-in wells. That is happening with oil prices around $25 per barrel, much lower than forecasters had been predicting. Although these reactivated wells represent only 8% of the pipeline's oil flow, it is indicative of the different economics of producers, as well as their motivations. The latter may be an important consideration. Were the reactivated wells only stripper wells, or more productive ones? What was the motivation – the need to generate income, or fear of permanent damage to the wells and their producing formations that would have denigrated their value? While these restarted wells may upset the rebalancing of the global oil market, this action may signal shale well breakeven levels are lower than generally assumed. Is that good news or bad?

**Exhibit 7. The Shifting Oil Futures Curve**




**Source: PPHB**

All the trends of the past couple of weeks suggests a faster recovery in oil demand than initially anticipated. This has buoyed oil prices, despite economic and health care news that signal the worst of the virus impact. If oil demand can be rising as rapidly as suggested by the early recovery data, we may be experiencing a V-shaped recovery, which, in turn, is supportive of higher oil prices.

**One forecaster suggested the recovery's shape may eventually look like a tilde: ~, which is really a modified version of the W-shaped recovery**

Where the recovery and oil prices go from here remains a guessing game. However, we believe that after this initial V-shaped recovery, the future may begin to look more U-shaped. One forecaster suggested the recovery's shape may eventually look like a tilde: ~, which is really a modified version of the W-shaped recovery. The tilde shape suggests the initial rapid oil price rebound is topping out and likely to head lower before it commences its next upward leg. That is not an extraordinary assumption, since oil prices are influenced by numerous factors: domestic production growth estimates, weekly inventory changes, vehicle miles driven, the number of air flights, and a recovery in domestic manufacturing and goods delivery. While most measures are demonstrating positive trends, the slow reopening of the economy and the ongoing activity restrictions will lead to slower growth in the future. Any meaningful uptick in Covid-19 cases could also bring back more economic restrictions, plus generate fear among the people, which would retard and/or possibly reverse oil demand gains, sending prices lower. Eventually, the virus will come to have impact on economic activity, and we will return to something closer to normal, which is defined as pre-virus conditions.

**Long-term Oil Market Outlook**

While the general shape of the tilde is known, its actual shape – height and duration – are unknown. The answers to those shape questions may begin to become clearer as we discuss long-term trends that will impact the global oil market.

Long-term demand for oil is a function of population growth and lifestyles, which define our economy and drive its growth. As a result of Covid-19 and government actions to retard its spread, much

of the world's economic activity has been curtailed. After weeks of shutdowns designed to "flatten the curve" of virus cases, most countries are achieving that goal. Whether government policy has shifted from "flatten" to "stopping" the spread of Covid-19 remains a debatable issue. Even those government officials who believe "stopping" is what is mandated in order to "promote the general welfare," the economic pain being inflicted on the citizens and their futures is forcing a gradual reopening of economies.

**The economic statistics released in recent weeks showcase the economic damage Covid-19 has caused**

The economic statistics released in recent weeks showcase the economic damage Covid-19 has caused. The jobs market is the most direct measure, although last week's Consumer Price Index decline of 0.8% for all urban consumers (seasonally-adjusted) for April, and a -0.4% decline for the core index excluding food and gasoline, was also stark evidence of economic damage. The overall index decline was the largest since December 2008 during the Great Recession, while the core CPI fall was the greatest in the history of records back to 1957. Two categories that impacted the core CPI were apparel and transportation. That was not surprising, as no one was shopping or traveling.

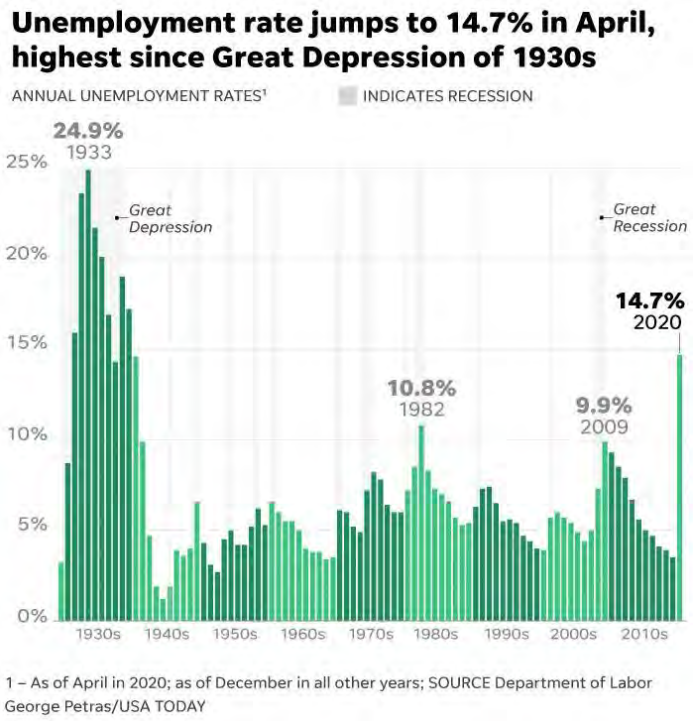
**That was a total of 36.5 million workers who lost their jobs in an eight-week period**

The unemployment picture has been deteriorating since the shutdowns began and millions of workers began filing for unemployment insurance. Up until March 15, weekly initial unemployment claims were running in the low 200,000s per week. Then, as a result of the economic shutdown, we saw 3.3, 6.9, 6.6, 5.2, 4.4, 3.8, 3.2, and 3.0 million workers filing weekly for initial unemployment benefits. That was a total of 36.5 million workers who lost their jobs in an eight-week period. The April monthly unemployment report showed a record 20.5 million jobs lost, resulting in the unemployment rate spiking to 14.7%. The actual unemployment rate was higher, as the Bureau of Labor Statistics announced it was unable to certify it had accurately counted all those who had lost their jobs. In fact, the BLS said in its press release, that the unemployment rate, assuming individuals who marked "employed but absent from work for other reasons" were included as unemployed, would have been five percentage points higher, or nearly 20%. Speculation by government and private economists is that the May unemployment rate may actually be higher than April's rate, although the gradual reopening of various state economies might produce an offset to additional unemployed workers.

**We also know that the economy will recover and workers will become employed once again**

Amazingly, the number of workers who lost their jobs in March and April due to Covid-19 has wiped out all the jobs created since April 2011. While we know the devastation brought on by the virus has been horrific, we also know that the economy will recover and workers will become employed once again. What we don't know is how quickly it will happen, nor how many employers will not reopen or will only need a portion of their prior workforce due to reduced business. Moody's economists forecast a 9% unemployment rate at

**Exhibit 8. Shutdown Created Terrible Labor Market**




**Source:** ***USA Today***

the end of 2020, while those at S&P Global estimate it may be down as low as 8%. Regardless of which estimate proves right, the estimates equate to a doubling of the unemployment rate prior to the outbreak of Covid-19.

**S&P Global economists are projecting full employment may not be reached until 2023-2024**

As depressing as the projected year-end unemployment rate estimates are, S&P Global economists are projecting full employment may not be reached until 2023-2024. Overcoming such a slow, extended economic recovery lies at the heart of the argument being made by S&P Global economists that the U.S. needs a massive infrastructure investment program to speed the recovery. Their view is that infrastructure investment has a history of boosting economic growth and returning more to the economy over time than the investment cost. While they mention the Roosevelt administration's efforts in boosting government spending to help end the Great Depression, most economists and historians note that the Depression only ended when our economy shifted into a war preparation phase.

Beth Ann Bovino, the chief U.S. economist at S&P Global, wrote in her report about infrastructure investment that the economic lift from President Dwight D. Eisenhower's initiative in creating the Interstate Highway System was significant. The primary reason for his plan was to make it easier for the U.S. military to mobilize troops and equipment around the country. This vision came after he

experienced the highly efficient autobahn system in Germany at the end of World War II. As a career military man, he saw the vulnerability the United States was exposed to by not having such a highway system.

To quantify the impact of the Interstate Highway Systems, Ms. Bovino wrote:

> "For evidence of this, look no further than Eisenhower's Interstate Highway System. Costing about $500 billion in today's dollars, it has clearly paid for itself given all the products and people that travel on its 48,000 miles of roads on any given day. Ike's project is reportedly estimated to have a multiplier equal to six--or, for every dollar spent, the U.S. got six dollars back."

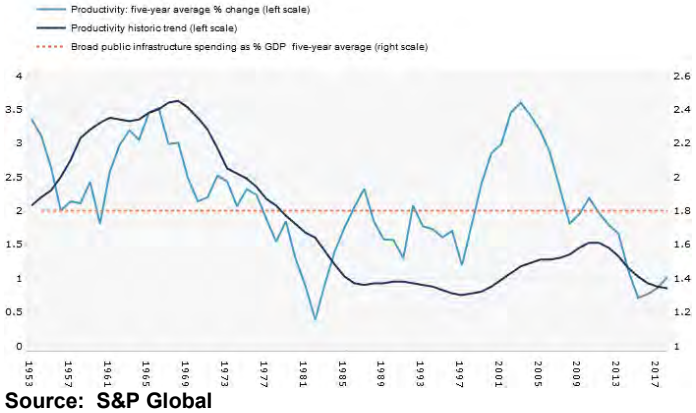
**"Ike's project is reportedly estimated to have a multiplier equal to six--or, for every dollar spent, the U.S. got six dollars back"**

That is an incredible economic multiplier, suggesting, as Ms. Bovino contends, that a massive infrastructure spending plan, such as being considered by Congress and the Trump administration, would boost the U.S. economy, something that ultimately may be needed, given the fallout from Covid-19. At the core of Ms. Bovino's argument for a huge infrastructure spending program is the necessity to deal with the decline in economic productivity the U.S. is experiencing. That is a major contributing factor to a lowering of future economic growth forecasts.

Exhibit 9 shows the history since 1953 of U.S. economic productivity. It shows how productivity peaked in the late 1960s before beginning a decline that initially bottomed in 1985. It then slid lower, reaching an all-time low in 1997. Productivity subsequently recovered, driven by the application of new technologies introduced in the 1990s. Productivity's rise peaked around 2011 and has declined steadily since, approaching the low of 1997. Importantly, the history of productivity shows it has been below the five-year average for broad public infrastructure spending as a percent of gross domestic product (GDP) since the late 1970s.

**It shows how productivity peaked in the late 1960s before beginning a decline that initially bottomed in 1985**

**Exhibit 9. Productivity Improvement Is Key For Recovery**

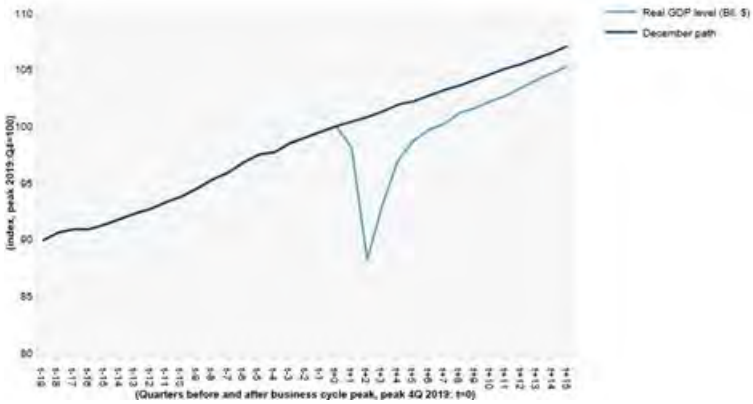



**Source: S&P Global**

**By 2024, the real GDP level will remain about 5% below the pre-virus growth trend**

Low productivity impacts economic growth by minimizing the benefit of labor force growth and the capital it has to work with. The Covid-19 pandemic has not only shocked the economy, it has shifted the growth path to the right, lowering the economy's potential output, as shown in Exhibit 10. By 2024, the real GDP level will remain about 5% below the pre-virus growth trend. That lower GDP will impact energy consumption, which when coupled with structural changes underway within the economy will alter the mix of energy between fossil fuel (transportation and manufacturing) versus renewables that can generate electricity, and the total demand for energy.

**Exhibit 10. Recovery Will Leave U.S. Growth Short**




**Source: S&P Global**

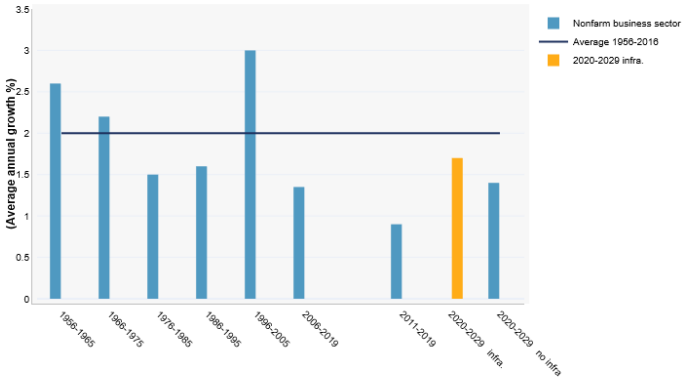
A study of productivity growth rates over time shows interesting patterns (Exhibit 11, next page). The chart shows the history of the measure of labor productivity used is real output per hour of all persons, which averaged 2% per year for 1956-2016. As the chart shows, the growth rate was highest in the 1996-2005 period when it averaged about 3% per year. That period's growth was partly driven by the technology revolution. Two other periods showed growth rates above the long-term average – 1956-1965 and 1966-1975. Both periods were dominated by manufacturing and rising living standards, supported by new products and the implementation of new technologies. Subsequent periods, impacted by higher energy costs and economic disruptions were lower.

**The lowest average productivity period was 2011-2019, largely associated with the fallout from the recovery following the 2008-2009 financial crisis**

The lowest average productivity period was 2011-2019, largely associated with the fallout from the recovery following the 2008-2009 financial crisis. The S&P economic forecast calls for productivity growth to increase by 50% compared to the earlier period, but it could be higher if their suggested infrastructure investment plan were to be undertaken.

We thought it would be interesting to see how productivity growth during the respective periods compared to total energy consumption, as well as total fossil fuel consumption. Exhibit 12 (next page)

**Exhibit 11. Infrastructure Might Boost Economy**

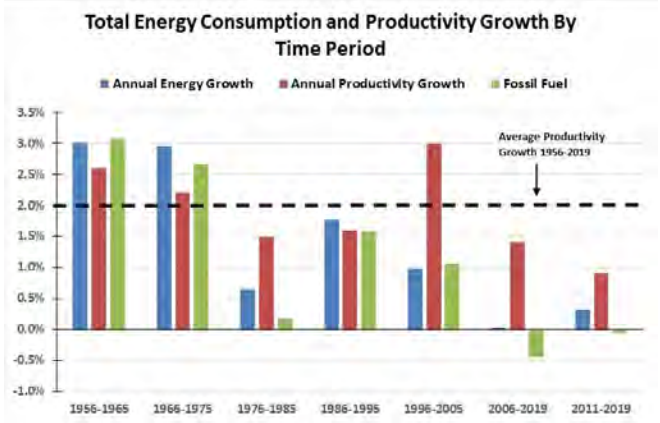



**Source: S&P Global**

**When productivity was low, so was energy and fossil fuel consumption**

shows those calculations. While not every period showed similar relationships, it is clear that the periods when our productivity was high, so was energy and fossil fuel consumption. Likewise, when productivity was low, so was energy and fossil fuel consumption. In fact, in recent years, fossil fuel consumption has fallen, which may reflect the decline in the use of coal in the power generation business. As a rough guide for what may lie ahead for the domestic energy and fossil fuel industry, the subpar projection for productivity growth signals lower or even further negative growth for fossil fuel consumption. As coal use continues to fall further, we are likely to see less oil consumed, also.

**Exhibit 12. How Energy Use And Productivity Compare**



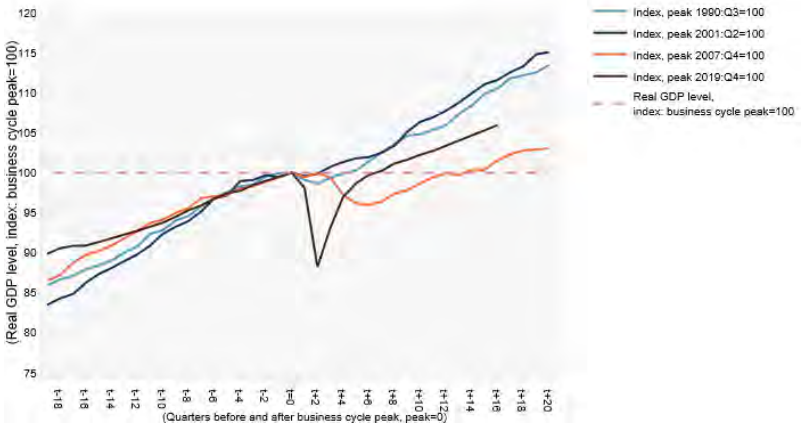

**Source: EIA, PPHB**

We are not going to debate the issue of an infrastructure spending bill, but rather we are using the productivity forecast, when compared to history, to help explain why future economic growth may be lower than earlier assumptions. Exhibit 13 (next page) shows how the economy responded in recovery periods following

**While the projected recovery is meaningfully better than the 2007 recovery, it falls well short of the 1990 and 2001 recoveries**

recessions, something we have unfortunately fallen into due to Covid-19. The worst recovery period followed the financial crisis noted by the peak in 2007 (orange line). The current recovery prediction is shown starting with the 4Q 2019 peak (black line). While the projected recovery is meaningfully better than the 2007 recovery, it falls well short of the 1990 and 2001 recoveries. Note that the three historical recovery tracks cover the subsequent 20 quarters, or five years, following the peak in the respective business cycles. For this recovery, however, the chart only projects future economic activity through the end of 2024 (16 quarters). If this recovery stays on the same trend line as the next four years suggests, the deviation from the 2007 recovery will be even greater at the end of year five.

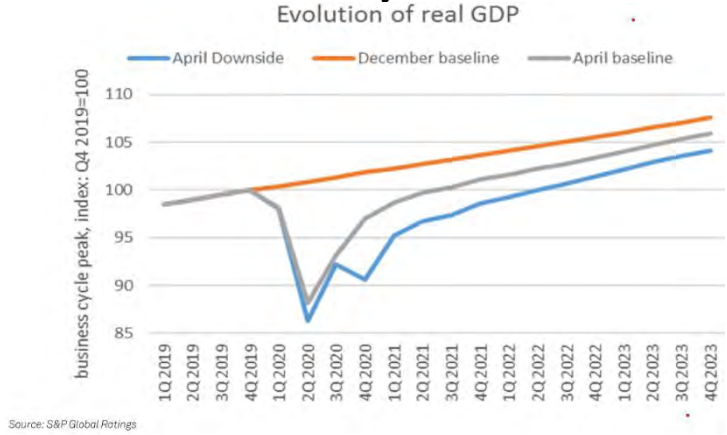
**Exhibit 13. Recovery Should Best 2008 Record**




**Source: S&P Global**

Based on the lower recovery pace, and as we saw earlier in Exhibit 10 (page 11), the economy is unlikely to return to its former projected growth path. That will translate into lower energy demand.

**Exhibit 14. How U.S. Recovery Trails Pre-Virus Forecast**

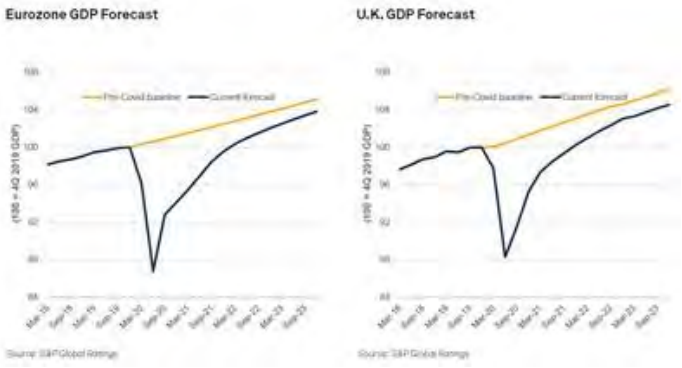



**Source: S&P Global**

**S&P economists covering Europe and Emerging Markets have a similar outlook, meaning global growth will be lower**

Moreover, the S&P economists covering Europe and Emerging Markets have a similar outlook, meaning global growth will be lower, as well as global oil consumption. In Exhibit 14 (prior page), S&P Global's April Downside forecast assumes a fall outbreak for Covid-19 requiring a return to a modest economic shutdown.

**Exhibit 15. U.K And Europe Mirror U.S. Recovery Shortfall**




**Source: S&P Global**

**S&P Global foresees several significant country economies experiencing slower growth in 2022 than their 5-year average growth rates**

One consideration shaping the S&P economist's views about the Emerging Markets recovery is the chart showing major countries and their 2021 and 2022 economic growth projections. You will note that S&P Global foresees several significant country economies experiencing slower growth in 2022 than their 5-year average growth rates. In particular, we are noting China, Indonesia, Malaysia and Turkey. All these markets have large populations and rising living standards, which traditionally stimulates economic growth, but they are not being stimulated as much as in the past. In certain cases, the lower growth projections reflect structural issues within those

**Exhibit 16. Are 2022 Growth Forecasts A Sign Of Problems?**

**Emerging Markets | Uneven Economic Recoveries**

GDP Growth

| Country | Latest reading (y/y) | Period | Five-year avg. | 2019 | 2020f | 2021f | 2022f |
|---|---|---|---|---|---|---|---|
| Argentina | -1.1 | Q4 | -0.3 | -2.2 | -7.0 | 2.6 | 2.5 |
| Brazil | 1.7 | Q4 | -0.8 | 1.1 | -4.6 | 3.3 | 2.9 |
| Chile | -2.1 | Q4 | 2.1 | 1.0 | -3.9 | 4.8 | 3.2 |
| Colombia | 3.4 | Q4 | 2.4 | 3.3 | -2.6 | 4.1 | 3.4 |
| Mexico | -1.6 | Q1 | 2.1 | -0.1 | -6.7 | 2.8 | 2.3 |
| China | 6.8 | Q1 | 6.7 | 6.1 | 1.2 | 7.4 | 4.7 |
| India | 4.7 | Q4 | 5.0 | 5.0 | 1.8 | 6.3 | 5.6 |
| Indonesia | 3.0 | Q1 | 7.0 | 5.0 | 1.8 | 7.5 | 6.5 |
| Malaysia | 3.6 | Q4 | 4.9 | 4.3 | -1.1 | 7.6 | 5.1 |
| Philippines | 6.4 | Q4 | 6.4 | 5.9 | -0.2 | 9.0 | 6.7 |
| Thailand | 1.6 | Q4 | 3.4 | 2.4 | -4.2 | 6.2 | 4.2 |
| Poland | 3.6 | Q4 | 4.2 | 4.2 | -4.0 | 5.0 | 2.7 |
| Russia | 2.1 | Q4 | 0.8 | 1.3 | -4.8 | 4.5 | 3.3 |
| Saudi Arabia | -0.3 | Q4 | 1.6 | 0.3 | -3.0 | 1.6 | 2.7 |
| South Africa | -0.5 | Q4 | 0.8 | 0.2 | -4.5 | 3.5 | 1.5 |
| Turkey | 6.0 | Q4 | 4.1 | 0.9 | -3.1 | 4.2 | 3.5 |

*Source: Haver Analytics, S&P Global Ratings.*
*Note: Red means GDP growth is below five-year average (2015-2019). Blue means the opposite. F—Forecast.*

**Source: S&P Global**

**Will the lower growth rates in 2022 be the start of an extended period of slower growth?**

economies. Will the lower growth rates in 2022 be the start of an extended period of slower growth? If so, then energy demand will be severely impacted, as these countries have significantly contributed to oil demand growth in recent years, and have been projected to continue that contribution. In certain cases, these economies are projected to play an even greater role in future energy demand and oil consumption.

**The company sees much slower international air traffic in the future – the long-term future, as it downsizes its ability to serve those routes**

Signs of slower long-term economic growth can be seen in the actions of automobile and air transport companies. Delta Air Lines, Inc. (DAL-NYSE) announced plans to retire all its Boeing 777 aircraft from its fleet, as the company sees much slower international air traffic in the future – the long-term future, as it downsizes its ability to serve those routes. In fact, the airline is shrinking so much that it now projects being overstaffed by 7,000 pilots this fall. Does anyone remember when there were shortages of pilots, and the flight hours of training to qualify as a professional pilot were reduced? When your market disappears, you are left with the work force you created.

**The expectation of slower global seaborne trade is leading to various shipping companies retiring older vessels of their fleets**

Another example of the economic fallout was the prediction by Danish shipping company Maersk, the world's largest container ship operator, that cargo volumes will shrink by 25% in the future. That is consistent with the forecast by Martin Stopford of Clarkson Research that we reported on in the last *Musings*. The expectation of slower global seaborne trade is leading to various shipping companies retiring older vessels of their fleets, which is further driven by the mandatory switch to cleaner-burning fuels that has translated into higher fuel bills. Reduced globalization and altered supply chains is reshaping the outlook for trade.

**A result of this slower growth is an auto industry that was saddled with at least 20% surplus manufacturing capacity prior to the outbreak of Covid-19**

The global automobile industry will also struggle. It took almost a decade for car sales in Europe to recover from the financial crisis in 2008. The U.S. market only needed five years to recover, but sales have been flat since 2015. A result of this slower growth is an auto industry that was saddled with at least 20% surplus manufacturing capacity prior to the outbreak of Covid-19. If people shy away from mass transit and favor commuting in personal cars, car sales may be boosted. On the other hand, the industry's investment in electric vehicles (EV), driven by the need to meet tighter emission standards and government bans on fossil fuel-powered vehicles, may force automakers to build them at the expense of other vehicles, which now are cheaper to own and operate. The biggest problem for automakers is that developing the technology to build EVs cars is hugely expensive, and their cost is not competitive with internal combustion engine cars. The massive investment to develop EVs may force the auto industry to consolidate to address its current financial woes, but every downsizing will be fought by the auto unions and politicians.

As we assess just these industries and their current turmoil and confusing outlooks, we can easily see 5-10 million barrels a day

lower oil consumption within five years. Last week, Bernard Looney, CEO of BP plc (BP-NYSE) was asked about "peak oil" by the *Financial Times*. His response was "Could it be peak oil? Possibly. Possibly. I would not write that off."

**While global oil demand crashed by 30% in April, even after lockdowns ease, Mr. Looney believes it is possible that demand may never fully recover**

While global oil demand crashed by 30% in April, even after lockdowns ease, Mr. Looney believes it is possible that demand may never fully recover. In his interview, he cited three issues facing the oil industry. First, Covid-19 has added to the magnitude of the future demand issue. How it plays out is not clear, but it likely means less oil will be needed. Second, people are recognizing the fragility of the climate, especially after they have seen clear air due to the economic shutdowns. Third, renewables are able to secure financing today, where traditional fossil fuels are struggling, and are likely to continue to struggle. What he failed to mention in the interview, but did highlight in his February introductory press conference, was the adjustment investors will need to make to deal with the lower returns on investment coming from renewable energy projects versus traditional oil and gas ventures. Increasingly, institutional investors are acknowledging their acceptance of those lower returns by eliminating traditional oil and gas stocks from their portfolios and vowing not to invest in the industry henceforward. We wonder if their investors understand that they are destined to earn less on these investments. Nothing about this energy transition is straight forward, just as none of the past ones were either.

**Given their financial resources, operational scale and global reach, this is the industry best equipped to solve the carbon emissions challenge**

We recognize, as Mr. Looney explained, the power of the large integrated oil and gas companies to both adapt to changing energy markets, but also their ability to marshal their scientific, technical and operational talent to solve the various energy and climate issues confronting us. Given their financial resources, operational scale and global reach, this is the industry best equipped to solve the carbon emissions challenge. Thus, this industry has a bright future, although the scale of its traditional oil and gas operations will be smaller than it is today.

## Plug-ins: 1 in 40 New Car Sales; Where's The EV Revolution?

**"One in 40 new cars sold globally was a plug-in"**

The headline of a recent article on *insideevs.com* reporting on electric vehicle (EV) sales in March was: "One in 40 new cars sold globally was a plug-in." March EV sales were 192,380, a decrease of 15% year-over-year, but still represented 2.5% of total vehicle sales. That says something about how bad auto sales were in the global economic shutdown. The decline in EV sales, as well as global car sales, was not surprising, as the industry sold only 5.5 million cars, 39% below sales during March 2019, according to *JATO Dynamics.* That represented the largest monthly decline since 1980 when *JATO* began reporting monthly sales, even exceeding November 2008, when sales fell 25% during the financial crisis.

**China's total vehicle sales were only down 30% in March, after falling by 79% in February, but its EV sales were about 60,000 units, down 51%, year on year**

In the European Union, excluding the U.K., March auto sales were 848,800 units, down 52% from a year ago. For the first quarter, sales were only 3.04 million units. Elsewhere, sales were equally as grim. The U.S. had total vehicle sales of one million units, down 38% from March 2019, and less than a 12 million seasonally adjusted annual rate. China's total vehicle sales were only down 30% in March, after falling by 79% in February, but its EV sales were about 60,000 units, down 51%, year on year. Latin American vehicle sales were also off 30%. The most surprising market was India. Due to the combined impact of the fight against the Covid-19 virus and the new BS-VI pollution regulations going into effect April 1, the world's fifth largest vehicle market did not see a single new car sale that month!

**Exhibit 17. How Car Sales Have Suffered In 2020**


**Source: LCM**

**Economic consulting firm *GlobalData* forecast in early May that the economic loss from the decline in auto sales in the U.K. was $3.97 billion, while in Germany it totaled $11.8 billion**

Is it any wonder why world economies are struggling during the global economic shutdown? Countries highly dependent on the automobile industry, such as Germany, are being particularly hard hit. Even with the reopening of auto dealers, Germany's April vehicle sales fell 61%, compared to a year ago. Sales in many European countries were worse in April than March, because shutdowns were in effect for all of April, but only part of March. Spain saw 4,000 sales in April, down 96.5%, while U.K. sales fell by 97.3%, to about 4,000 units. Italy's car sales were off 97.6%. Economic consulting firm *GlobalData* forecast in early May that the economic loss from the decline in auto sales in the U.K. was $3.97 billion, while in Germany it totaled $11.8 billion.

The economic landscape for automobiles is changing due to Covid-19 and government policies to fight it. The landscape is also being buffeted by the battle over the proper role for fossil fuels in the future economies of the world. While regulations and policies limiting the burning of fossil fuels in dealing with climate change had been gaining traction in recent years, the economic calamity due to the virus is creating meaningful pushback on these efforts. Restarting

economies and repairing society's financial damage is gaining the upper-hand in government actions over policies that may improve their citizens' lifestyles many decades in the future.

**Seeking even greater economic stimulus following the Covid-19 shutdown, in late April, China announced a two-year extension of its EV subsidies, through the end of 2022**

In recent years, China has struggled with establishing the role of its EV initiative versus the need for an economic boost from a more vibrant automobile industry. This is why it began restricting subsidies for EVs last year, while at the same time boosting subsidies for conventionally-powered autos. Seeking even greater economic stimulus following the Covid-19 shutdown, in late April, China announced a two-year extension of its EV subsidies, through the end of 2022. The current subsidy of 24,750 yuan ($3,495) will continue through July 23rd, after which it is expected to decline by 10% for the balance of 2020. Without the extension, the subsidy was scheduled to end on December 31, 2020. Expectations are that the subsidy will decline by 20% in 2021, and by 30% in 2022, with the possibility of no subsidies beginning in 2023. Additionally, only all-electric vehicles priced under 300,000 yuan ($42,377) are eligible for subsidies. There is one exception – vehicles with swappable batteries are not limited by price, which may be a concession to Chinese EV manufacturer NIO. It is also assumed EVs must still meet the minimum range of 400 kilometers (250 miles) per charge.

**That additional EV subsidy suggests the Chinese government does not expect a quick recovery for their automobile industry; therefore, the additional subsidy to help boost EV sales in 2021**

It is interesting that at the same time the Chinese government announced the extension of EV subsidies, it announced a sales tax exemption for New Energy Vehicles, which includes EVs, as well as other non-conventionally-powered vehicles, purchased between January 1, 2021, and December 31, 2022. That additional EV subsidy suggests the Chinese government does not expect a quick recovery for their automobile industry; therefore, the additional subsidy to help boost EV sales in 2021. The Chinese government's moves in late April would appear to bolster the argument for conventionally-powered cars gaining greater sales traction over EVs due to low gasoline pump prices after the collapse of oil prices.

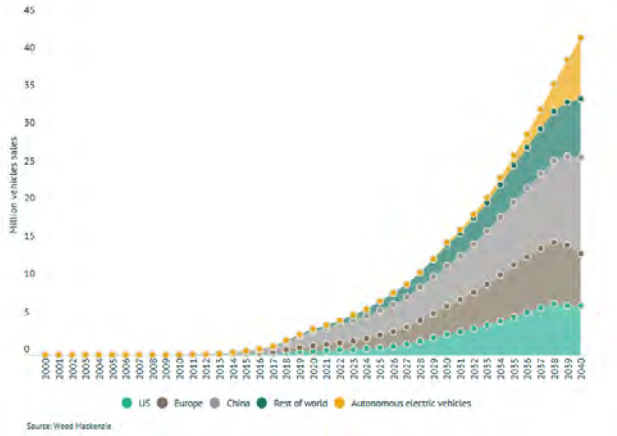
An early April forecast by energy consultant Wood Mackenzie predicts that global EV sales will total 1.3 million units in 2020, down 43% from the 2.2 million sold last year. In the forecast, U.S. 2020 EV sales are expected to lag 2019's sales, while China is expected to recover by November 2020 and Europe by December. With China's subsidy extension, we would question Wood Mackenzie's optimism. According to Ram Chandrasekaran, Wood Mackenzie's principal analyst, "Most new EV buyers are still first-time owners of the technology. The uncertainty and fear created by the [Covid-19] outbreak has made consumers less inclined to adopt a new technology. Once the epidemic is contained in China, we suspect consumers will flock back to car dealers and reaffirm their confidence in EVs."

Wood Mackenzie's forecast calls for EV sales reaching 38% of annual vehicle sales by 2040. By then, as their forecast chart

**It sees oil demand peaking in 2025 and the oil business losing five million barrels a day of demand by 2040 due to lower gasoline consumption**

shows, EV sales in both Europe and U.S. will be declining, offset by continued growth in China and the rest of world, as well as from an emerging, and rapidly growing, autonomous vehicle fleet. Most analysts believe autonomous vehicles will be EVs. In 2040, the forecast predicts 300 million EVs in the world's fleet. Importantly, it sees oil demand peaking in 2025 and the oil business losing five million barrels a day of demand by 2040 due to lower gasoline consumption.

**Exhibit 18. How One Forecaster Sees EV Market**




**Source: Wood Mackenzie**

**Critical to the purchase price equation is the cost of the battery and EV subsidies**

The EV industry, just as the entire automobile industry, is challenged by the Covid-19 outbreak, potential delays in fleet purchasing due to lower oil prices, and a wait-and-see approach to new car buying. Despite these problems, Wood Mackenzie's view is that automakers haven't changed their carbon-neutral goals and that governments won't defer or cancel policies designed to phase out conventionally-powered vehicles. In their view, while it's tempting to think the oil price crash is bad news for EV adoption, in reality the purchase price, charging infrastructure and available models currently have a much greater impact on sales. As those hurdles are lowered, EV sales will accelerate. Critical to the purchase price equation is the cost of the battery and EV subsidies.

**"EV buyers typically have higher incomes and are better equipped to weather a bad economy"**

Supporters of EVs make interesting arguments. Brad Berman, EV analyst at *Electrek.com*, was quoted in article by *Penta*, that "It's true that as a result of the pandemic, fewer people are buying EVs now. But the EV market is more resilient than the overall market. We see it in the sales of Tesla and the Chevy Bolt. EV buyers typically have higher incomes and are better equipped to weather a bad economy." Leaning on income inequality as an argument in support of expensive EVs is an interesting twist.

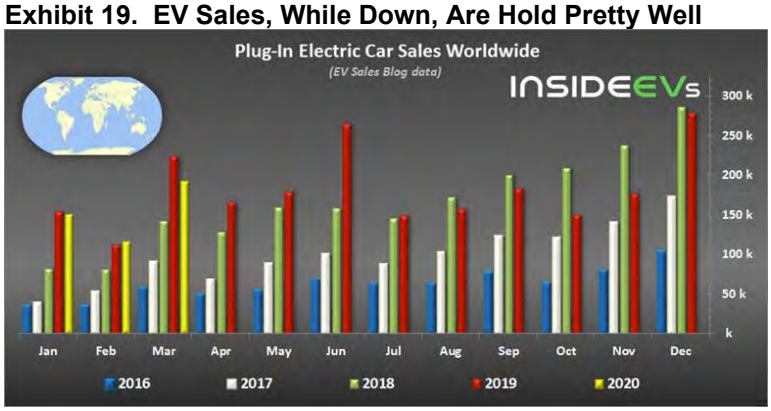
It will also be interesting to see what happens to Tesla and Bolt sales as 2020 unfolds, given that they are no longer eligible for the

$1,875 tax subsidy in the U.S. starting in the second quarter. How many of those model sales in the first quarter were driven by the prospect of the subsidy disappearing?

**"In some markets during March, Chevrolet was leaving $10,000 in incentives on the hood"**

Mr. Berman also noted another possible reason for Chevy Bolt's strong sales – 5,873 units, an increase of 36.1%. As he noted, "In some markets during March, Chevrolet was leaving $10,000 in incentives on the hood." According to *truecar.com*, the 2020 Bolt EV has a starting price of $36,620, which is high for an EV. With $10,000 in incentives, that lowers the cost to only $26,620. This maneuver proved important for Chevrolet, as the Bolt accounted for 1.3% of its total sales for 1Q 2020. At that price, we doubt Chevy made any money on its March Bolt sales. Since General Motors (GM-NYSE), the owner of Chevrolet, no longer provides monthly sales figures, we have no way of knowing its March Bolt sales.

**Exhibit 19. EV Sales, While Down, Are Hold Pretty Well**




**Source:** ***insideevs.com***

Once again, the key for the EV success is their cost and subsidies. According to an AlixPartners consumer survey last summer, 41% of Americans cited cost as a top-three concern about buying an EV, up from 29% in 2018. As a case in point, the Hyundai Kona comes in a gasoline version and an EV version. The gas car's base price is $20,100, while the EV model starts at $36,900. Even with the full government subsidy of $7,500, there is still a 46% premium for the EV. It will take a lot of fill-ups to offset that price spread.

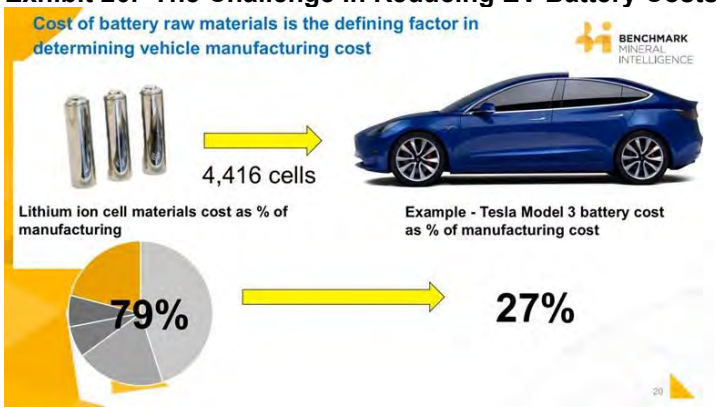
**AlixPartners says battery costs are coming down 4% a year**

It costs manufacturers more to produce an EV, primarily due to the cost of the battery. Internal combustion powertrains cost automakers an average of $6,500 per car, according to AlixPartners. The average for an EV is $16,000. Battery pack prices are declining. The issues become how fast and whether the declines already seen can be sustained? AlixPartners says battery costs are coming down 4% a year. They believe it will take a major development in battery technology to cause battery prices to plunge. In the meantime, EVs are money-losers for all major automakers.

**Raw materials represent 79% of the cost of the battery**

Benchmark Mineral Intelligence shows that raw material costs are key to battery costs, and in turn, to the economics of EVs. As a slide from a recent presentation shows, raw materials represent 79% of the cost of the battery, which is 27% of the cost of a Tesla Model 3.

**Exhibit 20. The Challenge In Reducing EV Battery Costs**

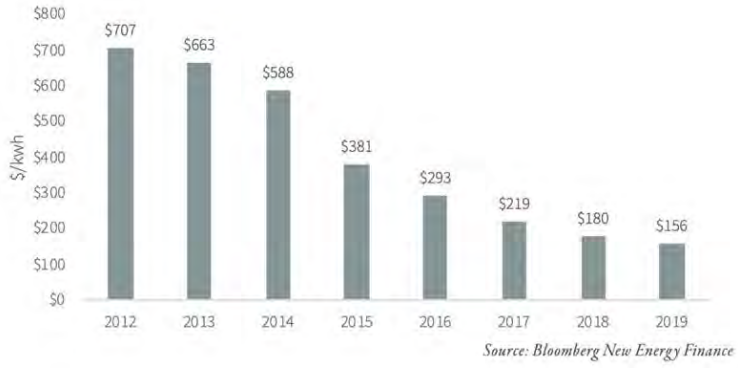



**Source: Benchmark Minerals**

**It shows significant progress in lowering costs over the last decade**

Battery cost estimates differ among forecasters. Exhibit 21 shows the latest history of battery costs from the 2019 study by Bloomberg New Energy Finance (BNEF). It shows significant progress in lowering costs over the last decade. Benchmark has a different set of cost estimates. Based on their presentation, 2020 battery costs are $117 per kilowatt-hour (kWh). They state that their estimates exclude profit margins on modules and the battery pack cost. That would seem to make it closer to the cost of the raw materials and the processing of them, in order to become part of battery packs. According to Benchmark, in 2014, the battery cost $290/kWh versus BNEF's $588 estimate. In 2018, the spread was from $135/kWh to $180. Whether this spread is completely due to the costs excluded is unclear, which makes the comparisons going forward more difficult to understand.

**Exhibit 21. Can Battery Cost Reduction History Continue?**




**Source: BNEF**

**BNEF stated: "There is much less certainty on how the industry will reduce prices even further," or getting from $100/kWh to BNEF's target of around $60/kWh by 2030**

Benchmark sees the battery cost continuing to decline to $105/kWh in 2022, then to $97 in 2024, and finally to $91 in 2026. BNEF said last year that "the path to achieving $100/kWh by 2024 looks promising, even if there will undoubtedly be hiccups along the way." While good progress has been achieved in reducing battery costs, they still remain too high for EVs to become profitable. What about for the future? BNEF stated: "There is much less certainty on how the industry will reduce prices even further," or getting from $100/kWh to BNEF's target of around $60/kWh by 2030. This statement would seem to confirm AlixPartners view that it will take major technology changes to drop battery prices materially. However, if the industry maintains it historical 4% per year price decline rate, it will only reach $99/kWh by 2030, not $60.

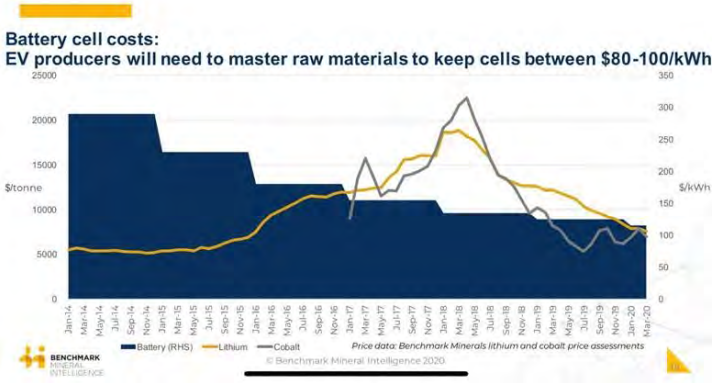
**One of the assumptions of EV cheerleaders is that battery technology will follow a version of Moore's Law**

One of the assumptions of EV cheerleaders is that battery technology will follow a version of Moore's Law. That law refers to predictions made in 1965 by Intel (INTC-Nasdaq) co-founder Gordon Moore that the number of transistors that can be packed into a given unit of space will double about every two years. This meant that the performance of devices could improve while their cost could decline. Over the past 50 years, this law has largely proven true, which explains why laptop computers, iPads and iPhones have improved performance dramatically, at the same time their costs have tumbled. This law is used to predict all things technologically, including EVs and their batteries, but it may not be applicable.

**The speculation is that the next $50/kWh drop will be much harder**

The doubts about the applicability of Moore's Law to EV batteries comes from the realization that most of the cost improvement has come from one-time gains. That view is based on an analysis of the battery cost models maintained by Argonne National Laboratory. The drop in battery cost from $750/kWh to $156 was relatively easy. The speculation is that the next $50/kWh drop will be much harder. The explanation for the earlier drop was increased battery plant utilization, increased battery size, reduced chemical prices, and battery chemistry improvements.

**Exhibit 22. Raw Material Prices Drive Battery Costs**




**Source: Benchmark Minerals**

If one looks at what has happened to lithium and cobalt prices since 2017, the major price declines have been a material contributor to lower battery costs.

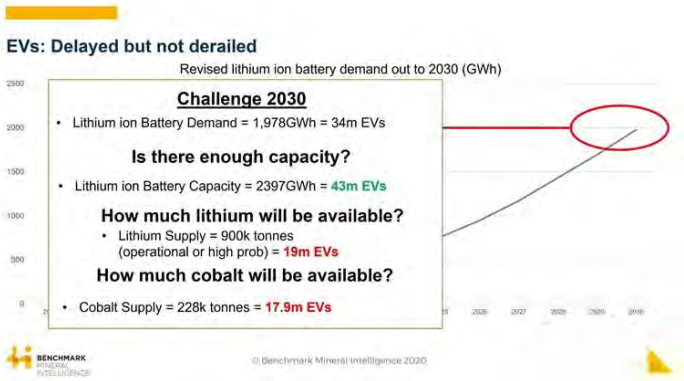
**The big change in EV battery technology – a move to solid state lithium batteries – appears to have been pushed out to 2030 or beyond**

The potential for a change in battery chemistry from lithium-ion to lithium-sulfur could help. A massive switch does not appear to be underway. The big change in EV battery technology – a move to solid state lithium batteries – appears to have been pushed out to 2030 or beyond, versus the prior expectation that it would arrive in the early 2020s. Now, battery research firms are focusing on how EV manufacturers may need to become involved in the procurement of battery raw materials, as well as completely revamping their supply chains to lower their cost.

**The challenge is that lithium supply will only meet the needs of 19 million EVs, while cobalt will only be able to supply 17.9 million EVs**

The real challenge will be in the battery raw material procurement. A chart from Benchmark's webinar shows what the limitation is for EVs. It is raw materials. In the firm's forecast for 34 million EVs in 2030, it is expected that there will be sufficient lithium-ion battery manufacturing capacity to produce 43 million EVs. The challenge is that lithium supply will only meet the needs of 19 million EVs, while cobalt will only be able to supply 17.9 million EVs. Those limitations equate to roughly a 45% supply shortage.

**Exhibit 23. Rare Earth Minerals As EV Bottleneck?**




**Source: Benchmark Minerals**

**One can certainly ask many questions about how investors will perceive EV manufacturers getting involved in mining operations to ensure adequate availability of raw materials for batteries**

One can certainly ask many questions about how investors will perceive EV manufacturers getting involved in mining operations to ensure adequate availability of raw materials for batteries. Or, will the EV manufacturers figure they will just leave this endeavor to battery suppliers? Who has the capital available for such new ventures? What are the geopolitical risks, depending on where new supply sources are found? Will the new supplies improve, or complicate the existing raw materials supply chains? Will we be held hostage to foreign suppliers? What are the ESG issues associated with mining rare earth minerals? There is the possibility of another potential supply source, that being recycling old EV batteries, although such efforts are currently uneconomic.

**We wonder if China, who is probably the best positioned nation with respect to battery raw materials to support a huge EV industry, is angling to do with EVs what it did with solar panels**

Given the challenges facing the EV industry as it plans its future, one should be less dogmatic about their expected success in a rapid penetration of the automobile fleet. The potential raw material shortages pointed out by Benchmark suggest significant business model adjustments will be needed by the EV industry if it is to grow substantially. While it may be too early to know, we wonder if China, who is probably the best positioned nation with respect to battery raw materials to support a huge EV industry, is angling to do with EVs what it did with solar panels – dominate the market with cheap, but less technologically sophisticated models.

To think about the EV future, it is useful to remember some of its past. At the birth of the modern automobile industry around the turn of the 20th century, EVs actually accounted for over a third of the vehicle fleet. The advent of the electric starter and the growth of our road system beyond cities favored the gasoline-powered car. In 1966, electric cars were introduced again, only to fail once more.

**In 2010, Nancy Gioia, director of global electrification for Ford Motor Co. stated that by 2020, 10% to 25% of the automaker's global sales volume would be hybrid, plug-in hybrid or pure-electric vehicles**

In 2010, Nancy Gioia, director of global electrification for Ford Motor Co. (F-NYSE) stated that by 2020, 10% to 25% of the automaker's global sales volume would be hybrid, plug-in hybrid or pure-electric vehicles. As best we can tell, those models barely register in Ford's sales this year. Over the past two years, Ford has announced plans to stop producing all its sedan models, while also planning for new hybrid and electric versions of each new vehicle model in its future line of cars and trucks, mostly beginning in 2020. Ford's dedication to hybrid technology, which some automobile writers call "old technology" and mocked the company's plans as the equivalent of going all-in on telephone handsets as iOS and Android cell phones were being introduced, may actually prove more successful given battery raw material limitations.

**Will the public gladly sign on to increased costs and mandates in a world where people are struggling to regain their financial footings after suffering through the Great Stop of 2020?**

Just how much the collapse of oil prices will slow the growth of EVs is unknowable now. The significant cost differential between internal combustion engine (ICE) cars and EVs, coupled with low fuel prices, will remain a headwind for EVs. Therefore, EVs will continue to depend on government mandates and subsidies, at least until significant battery technology breakthroughs cut EV costs. Will the public gladly sign on to increased costs and mandates in a world where people are struggling to regain their financial footings after suffering through the Great Stop of 2020? Economics suggests that EVs will suffer as consumers opt to keep their old ICE cars running, and are more willing to gamble on cheaper new ICE cars and low fuel prices, over cleaning up the environment.

EVs will still need to address consumer concerns, such as range anxiety. The solution is expanded charging networks, but the time to charge still needs to be reduced substantially. The charging issue is compounded by the lack of garages for locating charging-at-home plugs in urban and rural areas of the country. EVs may become a

moral issue in justifying living in suburbia. But then again, lifestyle and work patterns are about to change, as a result of Covid-19. We think the future for EVs is about to change, also.

## Are The Next Climate Change Cases Going Off The Rails?

On May 6th, the Circuit Court of Appeals for the Tenth Circuit (covering the states of Wyoming, Utah, Colorado, Kansas, Oklahoma and New Mexico) held a hearing on the matter of Boulder County, Colorado, the city of Boulder, and San Miguel County versus a group of oil and gas companies over damages caused by the sale of their products. The suit was originally filed in Colorado state court in 2018. Industry lawyers successfully pushed the case to a federal court, arguing that state tort laws are not appropriate for a national and international issue. However, the federal court sent the case back to the state court for trial. As a result, the Tenth Circuit was reviewing the federal court's decision in the May hearing.

**The defendants argued there were technical issues that made the case moot, as it falls under an area of common law that is displaced by the Clean Air Act**

According to accounts of the testimony in the hearing that was conducted telephonically, lawyers for Exxon Mobil Corp. (XOM-NYSE) and Suncor Energy Inc. (SU-NYSE), the defendants, argued there were technical issues that made the case moot, as it falls under an area of common law that is displaced by the Clean Air Act, meaning no court can determine the issue. The issue, according to ExxonMobil's lawyers, makes it a kind of "transboundary pollution suit" that a series of U.S. Supreme Court decisions clearly preempts, leaving the resolution up to the federal government.

In response, lawyers for the plaintiffs argued that their lawsuit isn't about carbon emissions, but rather about the local harms linked to "unchecked sales" of fossil fuels and the intentional misrepresentation about their leading role in causing climate change. The lawsuit specifically referenced the increased climate related risks of floods, droughts and wildfires.

**The ExxonMobil lawyer argued that Congress never imposed any limitations on the grounds for judicial review in cases with venue disputes**

Another technical issue addressed in the hearing was the scope of appellate court review when a defendant bumps a state-court case to federal court by citing "federal officer" grounds, a doctrine that says cases involving U.S. officials generally belong in federal court. Many circuit courts say they can only review that single issue, not the entire remand order (other arguments), when a federal court returns such a case to state court. Energy company lawyers want the courts to review additional arguments for placing a case in federal court. This objective was questioned by one of the Tenth Circuit judges. He asked whether it was appropriate for the court to consider such issues, as they normally would not be subject to judicial review. The ExxonMobil lawyer argued that Congress never imposed any limitations on the grounds for judicial review in cases with venue disputes.

While the legal issues debated in the Colorado court hearing appear esoteric, they are important in the ongoing battle between environmentalists and oil and gas companies over climate change liability. There are similar climate change cases brought by state and local governments that are pending in federal appellate courts in the First Circuit (covering Maine, New Hampshire, Massachusetts, Rhode Island and Puerto Rico), Second Circuit (covering Vermont, New York, Connecticut), and Ninth Circuit (covering Washington, Oregon, California, Montana, Idaho, Nevada, Arizona, Arkansas, Hawaii and Guam). The Fourth Circuit (covering West Virginia, Virginia, Maryland, North Carolina, South Carolina and the District of Columbia) recently rejected an appeal from oil and gas company defendants, which allowed a climate case initiated by Baltimore to proceed in Maryland state court.

**In a number of those suits, federal judges dismissed them by pointing to Congress as the appropriate venue for resolving matters dealing with climate change**

Why is this important? There are a number of cases pending review for going to state courts, as indicated above, as the effort on climate lawsuits on each coast have been less successful than environmentalists had hoped. In a number of those suits, federal judges dismissed them by pointing to Congress as the appropriate venue for resolving matters dealing with climate change, or other matters have proven to be higher hurdles. The most high-profile case was the one brought by New York State against ExxonMobil for misleading investors about the financial impact of climate change on the value of the company's reserves.

**These articles established a narrative that the company covered up its knowledge of the environmental damage caused by the burning of their oil and gas output**

The march to the New York courthouse began in 2015 after a trove of ExxonMobil internal documents spurred a series of stories by *InsideClimate News*, and later the *Los Angeles Times*. These articles established a narrative that the company covered up its knowledge of the environmental damage caused by the burning of their oil and gas output, and that they actively engaged in a campaign to refute the science and disparage climate change proponents.

In the case, the attorney for New York State argued that since ExxonMobil scientists knew of, and briefed management about the dangers of carbon emissions causing climate change as early as 1977, the pushback was actually a cover-up, making the company liable for damages. There was also evidence that the American Petroleum Institute issued a report in 1968 warning that the potential damage from burning fossil fuels "could be severe," with impacts like rising sea levels and warming oceans.

The lawsuits make a public nuisance claim and, in some cases, allege negligence. Essentially the lawsuits say the oil and gas companies have known for decades that burning fossil fuels is one of the biggest contributors to climate change. Instead of acting to reduce harm, the companies attempted to undermine climate science and mislead the public by downplaying the risk posed by fossil fuels. For this the companies must pay.

**Mr. Raymond, the skeptic, is the holder of a PhD in chemical engineering from the University of Minnesota**

When climate change, formerly known as global warming, began to dominate the news in the early 2000s, ExxonMobil was headed by Chairman and CEO Lee Raymond. He made the argument that there were serious questions about the science linking carbon emissions with climate change. That linkage is key to the climate change theory. Mr. Raymond, the skeptic, is the holder of a PhD in chemical engineering from the University of Minnesota. His skepticism was grounded in the actual science he had studied.

**ExxonMobil offers plaintiffs a target with very deep financial pockets**

With Mr. Raymond as a lightning-rod, and ExxonMobil being the largest oil and gas company, and at one point the largest American corporation, it was easy to see how it became the favorite target of environmentalists. Although ExxonMobil and the industry have fallen on difficult times, this has not lessened the company from being targeted in climate lawsuits. With $362.6 billion in total assets and a market capitalization of $193.4 billion, as the largest international oil and gas company, ExxonMobil offers plaintiffs a target with very deep financial pockets.

We are now finding out how important money is as a motivator for bringing climate change lawsuits, especially if they can be brought in state courts. This playground affords plaintiffs both a homefield advantage in court, and often favorable public nuisance laws under which to level the suits.

**According to *Desmogblog.com*, the word "deception" (or some variation thereof) was used 37 times, while the word "mislead" and its variations was found 21 times**

On July 2, 2018, Rhode Island filed suit against 24 oil and gas companies for their involvement in causing climate change. The companies are being sued over their deception about the environmental harm their products cause, as well as for climate-related damages under public nuisance laws. The Rhode Island case is one of over a dozen similar climate suits by states, cities and one trade association. Several of these cases are being handled by a California law firm, Sher Edling, that initiated the entire effort in its home state. Unfortunately, their cases in the Bay Area were tossed out by a federal judge as not being within the purview of the courts. but rather should be directed to Congress. Both the Rhode Island and Baltimore cases are being directed by Sher Edling, and in both pleadings, the approach and terminology were similar. According to *Desmogblog.com*, the word "deception" (or some variation thereof) was used 37 times, while the word "mislead" and its variations was found 21 times.

In the Baltimore case, the Fourth Circuit sent the case back to Maryland state courts for adjudication. The defendants have appealed to the U.S. Supreme Court to overturn that ruling. Energy Policy Advocates (EPA), a non-profit organization dedicated to bringing transparency to the actions of government have been granted permission to file an *Amicus Curiae* brief in support of the defendants. EPA has also filed an *Amicus Curiae* in the appeal to the First Circuit that is hearing the question of whether the Rhode Island case should remain in state court. In that filing, EPA

**Disclosed documents it had obtained from public records**

disclosed documents it had obtained from public records of Colorado State University's Center for a New Energy Economy, under the Colorado Open Records Act. These documents were provided to the First Circuit with regards to the litigation it is considering. As the *Amicus Curiae* states:

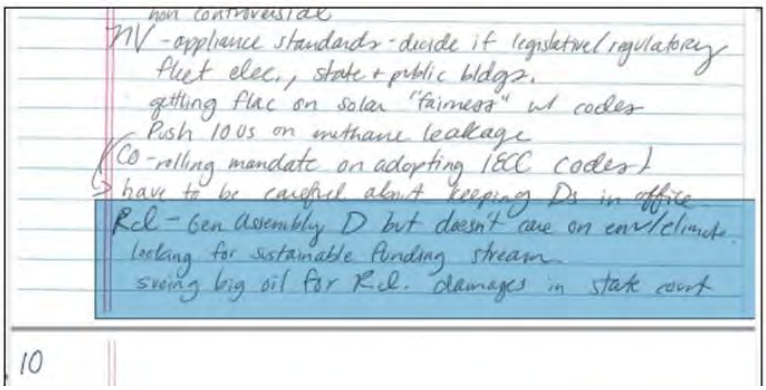
> "The records pertain to a two-day meeting in July 2019 hosted by the Rockefeller Brothers Fund (RBF) at the Rockefeller family mansion at Pocantico, NY. They include numerous emails, agendas and other materials. Most pertinent, they also include a set of handwritten notes and a second, corroborating set of typewritten notes. According to the public records themselves, the former was prepared by attendee Carla Frisch of the Rocky Mountain Institute (RMI), and the latter by attendee Katie McCormack of the Energy Foundation.
>
> "This was a private event, styled 'Accelerating State Action on Climate Change,' hosted as a forum for policy activists and a major funder to coordinate with senior public employees, e.g., a governor's chief of staff and department secretaries and their cabinet equivalents from fifteen states. These states included First Circuit Plaintiff the State of Rhode Island, represented by its Director of the Department of Environmental Management, Janet Coit."

**During the meeting, Director Coit discussed, among her peers, Rhode Island's entry into the litigation**

During the meeting, Director Coit discussed, among her peers, Rhode Island's entry into the litigation. The notes recorded contemporaneously by Ms. Frisch state the following:

**Exhibit 24. Notes Of Director Coit's Comments At RBF Meeting**

> "RI – Gen Assembly D but doesn't care on env/climate
> "looking for sustainable funding stream
> "suing big oil for RI damages in state court"




**Source: Energy Policy Advocates**

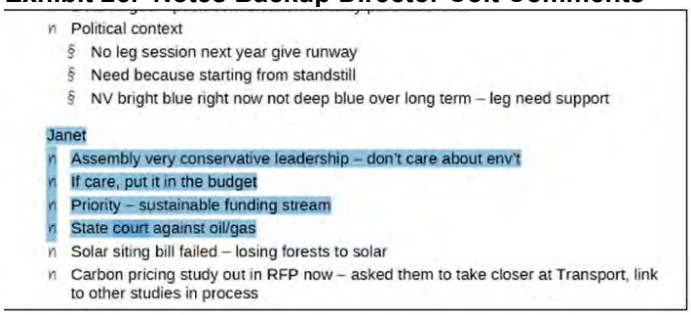
The EPA brief stated: "This entry on its face represents a senior official confessing that Rhode Island's climate litigation, essentially

identical to that in the Baltimore case below, is in fact a product of Rhode Island's elected representatives lacking enthusiasm for politically enacting certain policies, including revenue measures, thus leaving the state 'looking for [a] sustainable funding stream,' and so 'suing big oil.' This characterizes all such governmental plaintiffs and suits including the matter in the Fourth Circuit case which is the subject of the Petition in this matter."

**Ms. Frisch did not mishear what Director Coit said**

As the EPA went on to note in its brief, Ms. Frisch did not mishear what Director Coit said, as Ms. McCormack's notes mirror the same points.

**Exhibit 25. Notes Backup Director Coit Comments**




**Source: Energy Policy Advocates**

**The use of levelized cost of energy misapplies capital costs and essentially calculates for the marginal cost of renewable power**

As renewable energy struggles to gain scale, its economic case continues to be undercut by faulty analyses and political shenanigans. The use of levelized cost of energy (LCOE) misapplies capital costs and essentially calculates for the marginal cost of renewable power. Comparing renewable projects that last for 10 to maybe 25 years, ignores the cost to rebuild them so their economics can be compared to fossil fuel plants with 40-50-year operational lives. The cost to overcome the intermittency of renewables is never factored into the calculations, either.

**What was changed, however, was the definition of "commercially reasonable" for purposes of the Commission's review of the new PPA**

With respect to shenanigans, for those who don't know or don't remember, the Rhode Island legislature rewrote the state's laws to guarantee the approval of the Deepwater Wind project, the 30-megawatt wind farm offshore Block Island. The project had negotiated a 20-year power purchase agreement (PPA) with a starting price of 24.4-cents per kilowatt-hour and a guaranteed 3.5% annual price escalation. After the Rhode Island Public Utilities Commission rejected the initial application, the rules to be applied in the analysis of the second application were rewritten, assuring the same starting price and annual price escalation. What was changed, however, was the definition of "commercially reasonable" for purposes of the Commission's review of the new PPA. That clause was what governed the cost-benefit analysis that led to the rejection of the first PPA. At the time of the agreement, the PPA's starting price was more than three-times the average cost of power in Rhode Island in 2010. The PUC also had determined that the

project would not create the number of new jobs it reportedly claimed. Without the "commercially reasonable" test, the second PPA was approved, but not without verbiage in the ruling suggesting it would have been rejected had the original test still been in place.

**The lawyers behind these climate cases know that by keeping them in state courts they have a greater possibility for winning**

The notes from Director Coit's comments at the RBF meeting should be a wake-up call to the citizens of Rhode Island, as well as residents in all the other states where public nuisance lawsuits over climate change are being filed in state courts. Rhode Islanders should understand that its political leaders – the governor, and its senators and Congressional representatives – are motivated by a very different agenda than the state legislators. We have yet to determine who is the fox and who is the hen in this scenario. The lawyers behind these climate cases know that by keeping them in state courts they have a greater possibility for winning. There are huge paydays for those lawyers who take these cases on a contingency basis. Win, and you hit the cash jackpot. Lose, but you still earn a reasonable fee. For the politicians who launch the climate lawsuits, the potential dollars from Big Oil are stars in their eyes.

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