

# Revolutionary History Made Personal

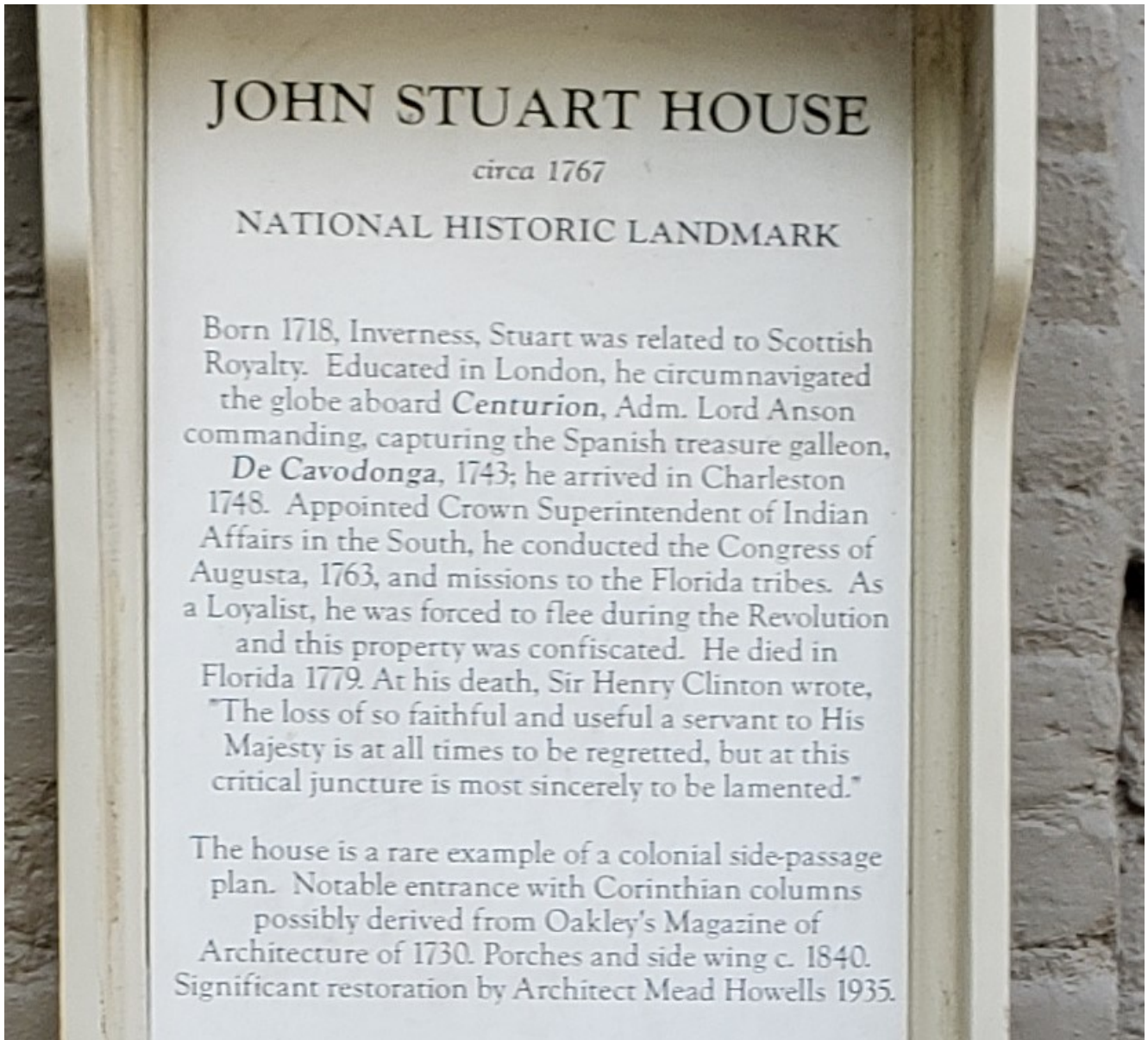
History is about people, and personal connections always add interest. On hearing we'd be visiting Charleston, SC a good friend, Austin Sayre, suggested we stop by his family's ancestral home. The [Colonel John Stuart House](#) is in Charleston's historic district, where many of the homes have a plaque describing their former owner's significance. Colonel Stuart is one of Austin's ancestors.

The plaque and Wikipedia together describe [Colonel John Stuart](#), a Scottish rebel who later represented the British government in dealing with Native Americans. Born in 1718 in Inverness, he arrived in Charleston in 1748. During the Revolution, his loyalty to the British crown meant he had to flee Charleston, and his house was confiscated. Stuart died in Pensacola, FL in 1779. The British Commander-in-Chief in North America, General Sir Henry Clinton, lamented, "The loss of so faithful and useful a servant to His Majesty."

Charleston is a beautiful old city. Dozens of fine homes in the historic district have been restored, and it's absorbing to stroll among them while reading about the lives of former residents. The water front is picturesque, and is best experienced on foot wandering down the narrow streets. The city also provided our first meal out in three months (see [Having a Better Pandemic in Charleston, SC](#)).

There's more to the story. John Stuart didn't just sail for the new world in search of opportunity. He was fleeing for his life. In 1745 Charles Edward Stuart ("Bonnie Prince Charlie") led the [Jacobite](#) rebellion, which sought to overthrow King George II in favor of Bonnie Prince Charlie's father, who was waiting in France. John Stuart, clearly of the same clan and therefore related, joined the uprising. It was put down at the

Battle of Culloden in 1746, where the English won a decisive victory.



What remained of the Scottish army returned to their homes in the Scottish highlands. But King George II sought revenge against the treasonous officers who had led the uprising. John Stuart was wanted, and likely faced execution if caught. He and his brother Francis left Britain, on a ship that brought them to Charleston. There, John Stuart eventually built the house we had visited, and his descendants ultimately included Austin Sayre.

Incidentally, the TV series [Outlander](#) portrays the events around Culloden, including the battle, in a number of gripping

episodes.

I contemplated this historical vignette and my connection with it. Part of it didn't add up. John Stuart had gone to war against the British Crown in 1746, following which he had fled the country. Just 14 years after Culloden, we find Captain John Stuart in the local militia fighting the Cherokee Indians. He was captured, but later released in exchange for a ransom. In 1762, Stuart's familiarity with Native Americans led the British to appoint him Crown Superintendent for Indian Affairs in the South.

During the Revolution, John Stuart's loyalty to the Crown forced him to flee again, this time from Charleston. Why did this former rebel later pledge fealty to the king?

I asked Austin, who shared the story passed down to him through his family. King George II died in 1760. He was succeeded by his grandson, [George III](#), whose father, Frederick, Prince of Wales, had died in 1751 of a lung injury. Sometime after George III's accession, John Stuart and his brother Francis sought a royal pardon from the new king. George III was looking for friends in the colonies, and was perhaps also influenced by John Stuart's service in the 1759-61 Anglo-Cherokee war. Both brothers were pardoned. This is why the Scottish rebel spent his later years as a loyal subject. What a fascinating twist!

Francis subsequently returned to Britain, but John remained in Charleston until the Revolution. He built his house between 1767 and 1772, by which time he was Colonel John Stuart.

It's an obscure piece of history. The story was made real for us through visiting the home once owned by our friend's ancestor, and supplemented with additional information. Charleston felt closer to Britain than does everyday life in New Jersey, because its early history is so vividly British. Our shared histories are why, for this Brit, America has so

easily been home for 38 years and will be for the rest of my life.

I am descended overwhelmingly from English stock – my ancestors might even have been on the opposing side at Culloden, although Austin Sayre is too much of a gentleman to retain a grudge. Colonel John Stuart no doubt lamented the 1776 Declaration of Independence, but Austin and I agree that Britain's loss was the world's gain. We are a great country navigating a tough patch. We'll make it to the other side. We always do.

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## Dividends on Pipeline Stocks Remain High

Markets finished the strongest quarter since 1987 yesterday, led by the energy sector. The [American Energy Independence Index](#), which comprises North America's biggest pipeline stocks, is still down 29% for the year. Some investors are weary of years of underperformance against the broader market, combined with high volatility.

The volatility is largely a function of the investor base. In March, Closed End Funds (CEFs) that were forced to cut leverage at the lows added to the indiscriminate selling (see [The Virus Infecting MLPs](#)). Fund managers such as Kayne Anderson and Tortoise were to blame for not having the good sense to reduce risk earlier. The good news is that the consequent destruction of capital has rendered these CEFs less able to repeat, because they're now a lot smaller.

Back in March, investors had many concerns about dividend sustainability. The top ten companies, which represent over

half the sector's \$490BN market cap, all maintained payouts (Cheniere doesn't pay a dividend). A recurring question we get from investors is, what's the catalyst that will get stock prices higher? Putting aside higher crude oil, which usually coincides with improving sentiment, we believe the continued high dividend yields will draw in more buyers.

In [Pipeline Cash Flows Will Still Double This Year](#), we explained how falling spending on new projects is driving cash flows higher. Covid-19 has produced few positives, but one of them is an acknowledgment by the energy industry that investing in new production and its supporting infrastructure needs to be cut. It may not be what executives want, but investors can find plenty to like about reduced spending.

In the next few weeks companies will report earnings and updated guidance. We don't expect any of the biggest pipeline companies to cut dividends. Oneok (OKE) is probably the most at risk, but since they recently completed a secondary offering of common equity it would seem odd timing for them to cut.

Name	S&P Rating	Market Cap	Dividend Yield
Enbridge	AAA+	61.2	8.0%
TC Energy	AAA+	36.2	5.7%
Enterprise Products	AAA+	36.3	10.2%
Kinder Morgan	AAA	33.2	7.2%
Williams	AAA	22.3	8.7%
Energy Transfer	BB-	18.9	17.4%
HPLX	BBB	18.0	16.9%
Puritas	BBB	13.4	7.5%
ONEOK	BBB	13.1	12.4%
Cheniere	BB	11.8	0.0%
Average		26.9	9.45%

These top ten companies have an average market cap of \$27BN and an average yield of 9.4%, including Cheniere. Every three months pipeline stocks pay in dividends more than two years' worth of interest on ten year treasury notes. Energy has been too volatile, but the improving free cash flow picture that is supporting dividends contrasts positively with others. We don't know of another sector that is going to double its free cash flow this year.

Conversations with investors continue to reveal widespread caution about the overall market. The news on Covid-19 is rarely positive, and many find it difficult to maintain a constructive outlook against this backdrop. But Factset is still forecasting 2021 S&P500 earnings to be flat to 2019, fully recouping the Covid-19 drop in just one year. This, combined with low bond yields, continues to drive long term investors into stocks (see [The Stock Market's Heartless Optimism](#) and [Stocks Look Past The Recession and Growing Debt](#)).

The dividend yield on the top ten pipeline stocks is a staggering five times that of the S&P500. As investors become increasingly comfortable that these are sustainable, yields will be driven down by new buying. Earnings reports in the coming weeks will provide an important opportunity for companies to provide confirmation.

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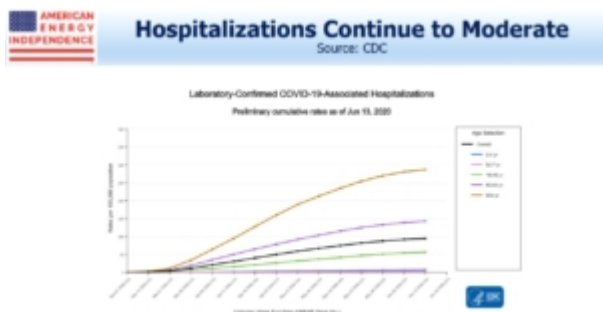
## **Taking The Politics Out Of Covid-19**

Covid-19 is probably the biggest political issue in America today. Liberals see a worsening situation in need of a slower return to normalcy requiring additional fiscal stimulus. Rising infections in Arizona, Texas and Florida provide plenty of quantitative support for this view. Conservatives reject this argument, presenting their own set of data. The restrictions on movement imposed by most states have offended those who perceive an unneeded loss of freedom – some even put face masks in this category, although masking up when in close contact with others seems a fairly trivial courtesy.

The sensational headlines continue to inspire fear, such as

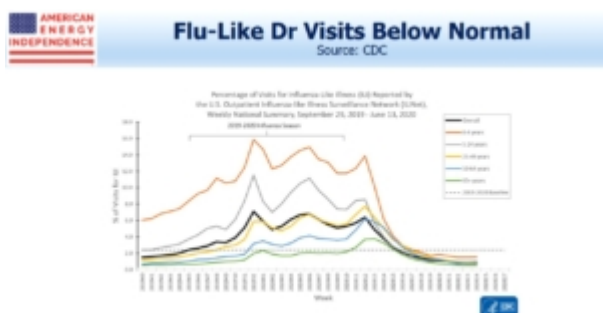


[Newsweek's](#) "Texas' Largest Hospital Reaches 100 Percent ICU Capacity". The article goes on to add that 72% of that capacity is being taken up by non-Covid-19 patients, which nullifies the headline. This is why "liberal media" has become a term of disparagement.



There is data to support the view that the pandemic continues to moderate, and is far less fatal than originally feared. A well-run hospital is always at 90-100% ICU capacity. Hospitals can free up ICU beds by canceling elective surgeries, and redesignate certain beds as ICUs, allowing them to operate at multiples of normal capacity.

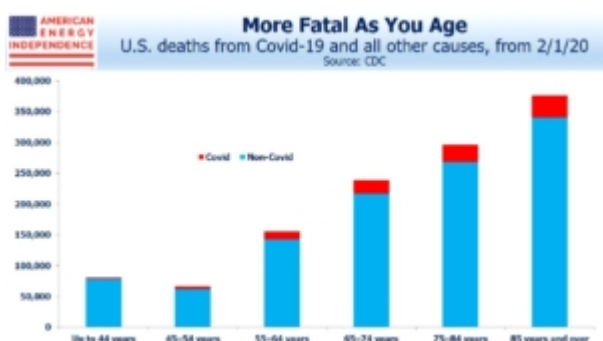
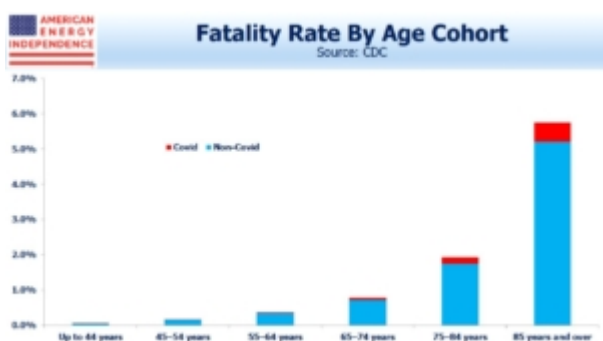
Making an optimistic case shouldn't imply that the proponent isn't worried about getting sick. A conversation with a friend who was hospitalized for four days convinced me this virus is better off avoided.



Conservatives note that positive test results are going up, but that it's due to increased testing. We're finding more infections because we're counting more. Liberals counter that the percentage of tests that are positive has edged up over 6%, which means it's not all down to increased testing.

However, this is still far below its [peak](#) of 21.8% in April. The criteria for testing have evolved, and riskier groups such as nursing home or prison populations will test higher. Because young people represent a bigger proportion of positive test results, some argue that they're not following social distancing guidelines. While there are lots of photos to support that, hospitalization data continues to moderate, which suggests that people who are testing positive aren't as sick. This is true even in Texas, where positive tests results are rising. Nationwide, hospitalizations and the fatality rate continue to fall. Doctor visits for flu-like symptoms are down.

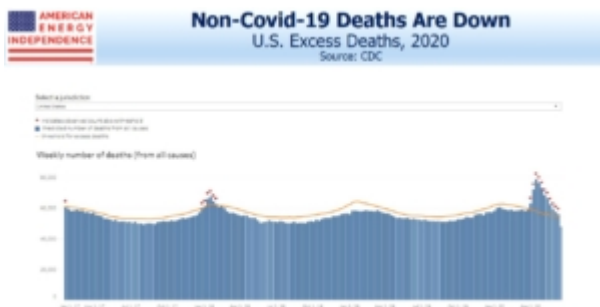
The strongest argument that Covid-19 is unlikely to kill millions comes from estimates of the overall infection rate. U.S. [fatalities](#) are 120,000 (defined as people who died where Covid-19 was a contributing factor, although it's now well known that other contributing factors such as obesity are usually present). Older people are far more vulnerable. CDC data shows that just 19% of fatalities are people under 65 years old.



We referenced a research paper on Wednesday ([The infection](#)



[fatality rate of COVID-19 inferred from seroprevalence data](#)) that estimated an Infection Fatality Rate (IFR) for those younger than 70 years old of 0.04% (see [Still Spreading, But Less Deadly](#)). CDC data doesn't precisely align, because they define age cohorts as 55-64 etc., rather than 60-70. But a reasonable estimate is that 30,000 people under 70 have died.



The 0.04% IFR implies that for every 10,000 people under 70 who are infected, four have died. This suggests that 75 million Americans have been infected (30,000 divided by 0.04%). It seems an impossibly high number – and yet, CDC Director Robert Redfield [said](#) on Thursday that, “5-8% of the American public has experienced infection, whether they recognized it or not.” This implies somewhere between 16 and 26 million Americans have been infected. With 2.2 million confirmed cases, that means for every positive Covid-19 test, another 7-11 people are infected but not bothered enough to visit a doctor. Redfield’s estimate is for the entire U.S. population, while the 0.04% IFR is for <70. But the two estimates are broadly consistent.

As with much of the data, it can confirm contrasting views. [How the Virus Won](#) reflects a Liberal view. Alternatively, for most of this year excess deaths have been below normal, partly because road fatalities are down (usually around 38K annually). It’s possible that we’ve avoided more deaths from all other causes than Covid-19 has caused, although nobody knows who those fortunate souls are. One Covid-19 death is one too many, but policymakers are responsible for making judgments for society as a whole based on the best data

available.

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# Still Spreading, But Less Deadly

Covid-19 cases are rising, especially in the south. Three weeks ago, my wife and I headed to South Carolina and beyond, where restrictions were limited and nobody we met knew anyone who had gotten sick (see [Having a Better Pandemic in Charleston, SC](#)). Masks were scarce, inside dining was permitted and it seemed like the old days. It was a glorious break from New Jersey with its opaque lockdown process and intermittent minor relaxations. However, rising infections in the south are causing some to suggest that people have been too relaxed in their efforts to avoid infection.

Covid-19 has become a political issue, so voting affiliation tends to color people's attitudes. The [New York Times](#) recently posted two graphs that can be harnessed by each end of the political spectrum. The Liberal narrative focuses on the early under-counting of deaths because of insufficient testing (noted below the charts) and the uptick in infections. Covid-19 has killed even more people than we thought, and is spreading.



The Conservative perspective looks at the earlier understated number of deaths, which are now being more accurately counted because of more widespread testing, and sees an even faster decline in fatalities. Moreover, the increase in infections doesn't seem to be arresting the decline. This suggests that we're simply finding more infected people, because we're testing more, and not that it's getting worse. Treatments are improving too, leading to better outcomes.

Since it's become a political issue, both sides can use the data to argue their case.

The median age of those testing positive is trending younger. In some counties in [Texas](#), the majority of the positive tests are now people below thirty. Dr. David Persse, public health authority for the Houston Health Department, said, "It is my current theory that elder persons have become more vigilant in taking precautions,"

This sounds plausible, since older people are far more vulnerable to suffering serious illness or death from the virus. And the rising rate of infections among young people could reflect their confidence that, even if they contract the virus, their symptoms will most likely be mild or even non-existent (asymptomatic). We're all growing weary of social distancing with its myriad restrictions on life as we knew it. Younger people seem to be increasingly willing to risk infection, since any negative consequences are likely to be mild.



This highlights the problem with requiring low-risk people to

follow behavioral rules that protect others that are more vulnerable. It doesn't seem much to ask in theory, but drinks at a bar with friends can easily seem a long overdue and justified proposition.

San Antonio mayor Ron Nirenberg also believes social distancing is being harmfully ignored, "While they may survive an illness, younger people are going to be stuck with a pretty hefty medical bill at the end of it." That doesn't sound like a compelling incentive – hence states like Texas are forced to reconsider how they impose social distancing.

But there's a problem with this interpretation that age groups are adopting risk-based behavior. For Dr. Persse to be right about older people more successfully protecting themselves, you'd expect to see young people represent a bigger proportion of deaths and older people less. But this data is fairly stable. It looks to us that we are simply identifying more infected people because we're testing more. Some may argue that deaths are a lagging indicator, but CDC [data](#) shows the same stable pattern for hospitalizations too. Although more young people are being counted as infected, the proportion of young people getting seriously ill or dying is not rising.



Early estimates of the Infection Fatality Rate (IFR) from Covid-19 were in the 3-4% range, based on data from China that assumed no asymptomatic spread. The New York Times [article](#) opens with 2.3 million+ cases and 120,345 deaths, implying an IFR as high as 5.2%. Projecting these IFRs across wide swathes of the U.S. population imply many millions of deaths, so it's

easy to see why governments took aggressive steps to protect people. But now we know that asymptomatic spread is high, which has greatly increased the infection rate. The fatality rate has correspondingly fallen as a result.

A recent paper from Stanford University ([The infection fatality rate of COVID-19 inferred from seroprevalence data](#)) has not yet been peer-reviewed, following recent practice to publish first with that caveat, in the interests of sharing analysis quickly. Serology tests estimate the infection rate across a population by looking for antibodies in blood tests. The Stanford paper uses data from 23 such studies, and arrives at an IFR of 0.04% for people under 70. This is why young Texans are drinking in bars and failing to follow social distancing. They probably take more risk getting home from the bar than when they're inside.

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## **Energy Markets Are Adapting Quickly**

Coronavirus approached us like a distant wave earlier this year. Initially it was remote and unthreatening, as we viewed developments far away in Asia. But it soon engulfed us, making our lives unrecognizable and crushing economic activity everywhere. As the first wave recedes, individuals and businesses are adapting to the new normal, while contemplating a second one later this year.

Demand for transportation collapsed, with global crude oil demand down a record 25% in April. Working remotely has been far less disruptive than many expected. While it's probably now a permanent feature, I suspect most businesses will adopt

a hybrid model. In-depth discussions, training and relationship building are all richer in person, when conditions allow.

Brazil's Petrobras plans to keep half its administrative staff [working from home](#) permanently, one of the first big companies to make such an announcement. This will impact over 10,000 employees. A new risk for large businesses is the possibility that an entire department could be incapacitated by a virus super spreader – and even after we've vanquished Covid-19, the hypothetical risk of a new virus will remain. Imagine the trading room of a global bank becoming infected. Traders can work remotely, but that presumes they're not already sick. A dispersed department is a safer one. Downtown real estate owners shudder. In the future, every business meeting will need to be of sufficient value to justify a possible exposure.



Aviation is years away from a return to normalcy. [Qantas](#) has now pushed back the resumption of international flights until at least October. Passenger volume through [TSA](#) checkpoints remains down 83% from a year ago.

Electric vehicles are not immune to weaker demand either. [Sales](#) of rechargeable batteries are forecast to fall for the first time in history, by 14% this year.

The energy sector is adapting. After losing over half its value through mid-March, the North American pipeline sector is the new momentum play, easily outperforming the overall market on the rebound. The International Energy Agency recently [forecast](#) that crude demand in 2021 will jump by 5.7 Million



Barrels per Day (MMB/D), recouping two thirds of this year's projected drop of 8.1 MMB/D. U.S. shale production, which dropped by 2 MMB/D during the lockdown, is expected to [recover](#) a quarter of this drop by the end of the month.

The increase in Free Cash Flow (FCF) at pipelines is a result of lower spending on new projects (see [Pipeline Cash Flows Will Still Double This Year](#)). Similarly, upstream investment is also slowing. Goldman Sachs expects capex for big oil projects to halve over the next couple of years, and fall by a third for liquefied natural gas. This structural under-investment will mean less new non-OPEC supply in the coming years, which Goldman argues will cause a multi-year cyclical upswing in commodity prices and better returns on invested capital. As energy investors, the last few years of poor returns have led us to regard almost any reduction in growth capex positively.

BP took a \$17.5BN [writedown](#) as they expect oil demand to remain on a permanently lower trajectory. They were still able to raise \$12BN in hybrid debt, equity-like securities which give BP the option to repay but may be perpetual. With coupons as low as 3.25%, there was clearly strong demand.

Lower crude oil production in the Permian in west Texas has reduced flaring, since less associated gas is being produced as well. The Texas Railroad Commission (RRC) is exploring ways they could limit flaring – since they've never rejected a flaring application, they are hardly a vigorous enforcer. Now at least one commissioner is considering the reputational harm flaring causes, which is at least a step in the right direction. We have long called for greater control (see [Texas Reconsiders Flaring](#), listen to [Stop Flaring Natural Gas](#) and watch [Stop Flaring](#)).

Businesses are adapting, and the brisk recovery in economic activity is helping. The new normal is almost here.

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# Oneok Hands New Buyers A Quick Profit

Last week Oneok (OKE) did a secondary [offering](#) of 26 million shares. It was priced at \$32, and diluted existing shareholders by around 7%. Although a healthy discount from two years ago when they [raised](#) \$1BN at \$54.50, it was nonetheless encouraging that a pipeline company could raise equity. On March 18, when the sector was roiled by desperate selling from incompetent closed end fund managers (see [The Virus Infecting MLPs](#)), OKE traded at \$12.16.

In reviewing OKE's recent stock price performance, a good friend of mine recounted some sage wisdom he once heard from a big investor: It's never a bad thing to let your new investors make money.

Like most of the sector, OKE rallied strongly from late March. Energy led the rebound in stocks, and on Monday, June 8 OKE traded briefly over \$48, almost 4X its low in March. This would have been a great opportunity to do a secondary offering, within touching distance of the price from two years earlier.



OKE management may have been thinking about it – judging from the stock's subsequent fall, they were likely even discussing

it, and perhaps injudiciously. But the announcement finally came two days later, after trading last Wednesday, June 10, when OKE closed at \$41.98.

OKE quickly sank on Thursday, dropping \$4 on the open and closing down \$6.65 at \$35.33. The secondary was later priced at \$32, a third lower than its price at the beginning of the week.

Most of those involved must be very happy. Buyers of the secondary never saw a loss on their investment, and by Tuesday 16th the stock had rebounded to \$38. The underwriters clearly did well, and even existing holders who didn't participate in the offering can draw comfort from OKE's now improved financial strength. OKE followed my friend's advice to let its new buyers make money.

Nonetheless, a more adept management team would have been preparing earlier to fully exploit the market's newfound passion for pipeline stocks. They would have been ready at \$48, rather than chasing the market down to \$32. Secondary offerings can be executed quite quickly.



By contrast, consider Tesla (TSLA). Given the trouncing he has handed short selling hedge funds and other skeptics, it's likely CEO Elon Musk's photo adorns many dartboards in Greenwich. The case for shorting TSLA was widely made and not that complicated – they were going to run out of cash. It was just a matter of when. Inconveniently for naysayers, this date with financial destiny kept being pushed off, as TSLA's operating results continued to surprise.

Losses on short positions expanded steadily late last year as TSLA rallied. In January, as the stock exploded upwards like a SpaceX launch, shorts capitulated and joined the indiscriminate buying. On February 4<sup>th</sup>, the day TSLA traded at \$969. Elon Musk gracefully allowed the shorts an exit, via a \$2BN secondary [offering](#) of 2.65 million shares. This was priced \$200 lower, at \$767, but since it was less than 1.5% of shares outstanding the dilution was inconsequential.

Coronavirus subsequently wiped out half the company's value, which likely caused the embittered hurling of a few more darts at Musk's likeness in Greenwich. But TSLA, like OKE and the rest of the market, has made a strong recovery since. However, the buyers of OKE's secondary are probably happier than the buyers of TSLA's. We think they'll have more to cheer.

We are invested in OKE

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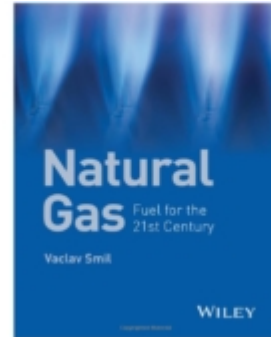
## Review of Vaclav Smil Natural Gas- Part 2

On Sunday we reviewed Vaclav Smil's [Natural Gas: Fuel for the 21st Century](#). Smil writes about how the world uses energy, well supported by useful facts and figures. Our original review was a brief summary of the book. Below, we highlight some of the fascinating proof statements Smil includes in his book.

For example – as a drill bit advances into a rock formation, the weight of the drill string above it increases such that it would surpass the 6.5-9 tons of weight that is optimal for fast rock penetration. So the block assembly atop the derrick

on the drill pad needs to support the weight of the entire drill and string combination.

Computer-generated 3D visualizations of rock formations include large-scale, immersive displays where people can walk inside the imagery.



There are about 3 million miles of mainline and other pipelines that link natural gas production areas and storage facilities with consumers ([EIA](#), 2019, updated from lower figures in Smil's book).

We often note that pipelines can provide many decades of operational life, depending on construction techniques and subsequent maintenance. Smil quotes a report from [The Role of Pipeline Age in Pipeline Safety](#) by Kiefner and Rosenfeld, "...a well-maintained and periodically assessed pipeline can safely transport natural gas indefinitely because the time-dependent degradation threats can be neutralized with timely integrity assessments followed by appropriate repair responses."

Smil estimated that pipeline transport of oil was 40 times safer than by rail and 100 times safer than by road, something climate extremists should consider since their pipeline opposition often leads to less safe modes of transport. The same analogy isn't possible for compressed natural gas because rail and road transport are so rare.

Many industries rely on natural gas for heat. The food industry uses pasteurization (heating to 72°C) for virtually all canned and conserved items, as well as dairy products, juices, wines and vinegar eliminate harmful pathogens.

Paper manufacturing requires heat to dry wet paper. Typically 1.1-1.3 lbs of water are removed for every 1lb of paper.

80% of U.S. bricks are made in gas-fired kilns where temperatures reach up to 1,360°C.

Methane (CH<sub>4</sub>) is the most important input for the synthesis of ammonia (NH<sub>3</sub>) via the [Haber-Bosch process](#), which has boosted agricultural productivity, without which the world couldn't feed its current population.

Ethane and propane, both natural gas liquids, are often found in natural gas along with more voluminous methane (known in isolation as dry gas). These are feedstocks for the production of polyethylene, polypropylene and polyvinyl chloride – in other words, plastics. The U.S. petrochemical industry has been a big beneficiary of these cheaper inputs, and the U.S. is easily the biggest exporter of natural gas liquids (of which ethane and propane are the two most important). For a fascinating view of the plastics business, check out Jordan Blum's terrific piece from 2018 in the Houston Chronicle's [Texas petrochemical plants turn ethane into building blocks of plastic](#). It shows how ethane from Texas is formed into polyethylene pellets, then shipped to Vietnam where it's turned into plastic packaging for frozen shrimp. It finally returns to a Houston-area grocery store.

Ethane production is part of the Shale Revolution. If you're wondering what its growth prospects are, consider that consumption is growing at almost 4% annually, and that per-capita [consumption](#) in non-Japan Asia is around a quarter of the developed world. Plastics use rises with living standards – clearly, much more re-use is required given consumption patterns.

The Center for Strategic and International Studies reports that there are 70 [cross-border pipelines](#) for natural gas, NGLs and petroleum products between the U.S. and Canada (Smil



counted 31 crossing points just for natural gas). When considering U.S. energy security, Canadian-sourced imports are practically riskless.

Although LNG transport has been thankfully safe, back in 1944 a poorly constructed storage tank in Cleveland failed. The resulting explosion killed 128 people. In 2004 an explosion at an LNG plant in Algeria killed 26 people. I grew up 22 miles from Canvey Island in the UK, an LNG delivery point since 1964 with little else to attract a visitor. My childhood was happily free of LNG incidents. Facilities that handle LNG in the U.S. undergo an exhaustive Federal permitting process.

Long before fracking, more quixotic attempts had been made to extract natural gas held tightly in shales. Incredibly, the U.S. experimented with explosions of nuclear devices. Three tests took place 1967-69 in New Mexico and Colorado using devices 3-9 times as powerful as Hiroshima. Full scale production envisaged 40-50 such detonations annually, but the early results were so far below expectations that the project was abandoned.

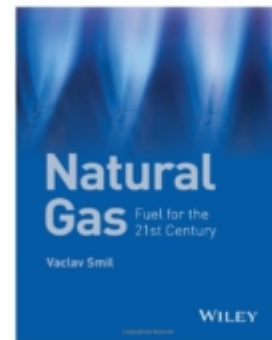
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## Review of Vaclav Smil Natural Gas – Part 1

Vaclav Smil is a prolific writer of books that explain how the world uses energy. Past titles include [\*Making the Modern World – Materials and Dematerialization\*](#), [\*Energy Transitions\*](#), [\*Energy Myths and Realities\*](#), [\*Energy: A Beginner's Guide\*](#) and [\*Energy and Civilization: A History\*](#). If you want to understand the physics, chemistry and economics of energy, you need go no further. [\*Natural Gas: Fuel for the 21st Century\*](#) is four years

old, but still provides a solid grounding in its importance for many decades to come.

What we call natural gas is mostly methane (CH<sub>4</sub>), and it's been produced by the decomposition of organic matter on earth for at least 3 billion years. Rising concentrations of atmospheric methane can be traced back to the expansion of rice cultivation in Asia, thousands of years ago, and didn't just begin with the industrial revolution. Ethane and propane are often present in the natural gas mix, although methane dominates. Methane is burned in power plants to produce electricity, and is used for heating and cooking in most homes. Ethane tends to be most valuable as a petrochemical feedstock into plastics, while propane is used to generate heat in various industrial processes, in backyard barbecues and in some cases for transportation.



The Shale Revolution in America has been as much about natural gas as crude oil, although it's the latter that draws more attention. Natural gas relies heavily on pipelines for transportation, so long term purchase agreements are common in order to justify the significant capital investment in necessary infrastructure. One of the most remarkable energy stories in the last decade is how the U.S. switched from planning greater natural gas imports to becoming a major exporter, as domestic production swelled. Greg Zuckerman's [The Frackers](#) recounts how Cheniere Energy turned reoriented Liquefied Natural Gas (LNG) terminals from import to export.

Facts and figures are the very essence of Smil's books, providing support for every statement. Methane has relatively

low energy density, which is why it has to be converted to near liquid form before loading onto LNG tankers; otherwise, the economics of shipment would be unattractive. This is also why it's not used in road vehicles, where propane's higher energy density makes it preferable although gasoline dominates because it has even higher energy density.

Natural gas storage is often underground, in depleted natural gas reservoirs, porous rock formations or salt caverns. A giant aboveground tank 100 meters in diameter and 100 meters tall would only hold enough natural gas to heat around 500 Canadian homes during a typical winter. Methane's high combustion efficiency has led modern residential natural gas-fired furnaces to reach efficiencies of 95-97%. No other fuel is this efficient. In power plants it generates less than 60% as much CO<sub>2</sub> as coal. Developing technology may bring further, dramatic improvements (see [Clean Fossil Fuels May Be Coming](#)). America's switch from coal to natural gas for electricity generation is why greenhouse gas emissions have fallen. It's also why getting China and India, the world's big coal users in the coming decades, to rely more on natural gas is one of the most important ways the world can combat global warming.

Today's Energy Transition anticipates the global economy's move from fossil fuels to zero-carbon based energy. The role of natural gas in this transition is hotly debated – as the cleanest burning fossil fuel, Smil believes (as do we) that it's going to be part of the solution to lowering emissions. The religious zeal of climate extremists makes no distinction between coal and natural gas, or the impracticality of eliminating 80% of the world's energy sources. Because this is so unappealing to most people, global emissions grow and Greta lectures ineffectively to virtue-seeking audiences (listen to [Davos Talks Climate Change](#)).

Smil provides many more useful insights about natural gas, which will be discussed in a later blog. For a highly informative read, pick up a copy of *Natural Gas: Fuel for the*

## **Pipeline Investors Welcome Less Spending**

Most energy investors wish the Shale Revolution had never happened. Energy independence was realized through sharply higher oil and gas output. But the promise of similarly bountiful investment returns was not. U.S. E&P executives have overspent and overproduced. Unfortunately, the midstream infrastructure sector too often followed along. Drilling and building infrastructure is in the DNA of many industry executives.

Spending on growth projects is how companies with capital discipline increase their profits. Because so many energy companies, both upstream and midstream, have been poor at capital allocation, investors now regard growth projects with suspicion. When it comes to growth capex, less is more.

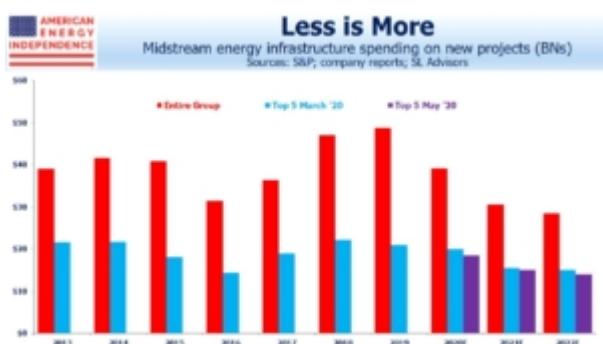
In the years preceding the Shale Revolution, midstream companies (then predominantly MLPs), weren't investing heavily in new projects. There wasn't the need. America was obtaining its oil and gas from roughly the same places in the same amounts year after year. Pipelines were about running a toll-model: charging fees for use of infrastructure, raising prices annually, spending on maintenance capex and finding productivity improvements to boost profits.

That's the pipeline business that attracted older, wealthy, K-1 tolerant income seeking investors. They've mostly left, because the industry abandoned the stable distributions they'd sought in favor of growth. The MLP model has lost favor to

the traditional corporation, with its ability to access a far wider set of investors.

The 2014-16 energy downturn, which now seems like a fond memory compared with this year's rout, saw a fall in growth capex as pipeline companies responded to the collapse in crude prices. But it wasn't long before spending on new projects recovered along with energy prices, and the industry returned to its new ways. By 2018 the industry was spending more than at the sector's peak in 2014. Investors were increasingly boycotting energy names as a protest at continued new projects.

By 2019, pipeline execs who had long complained that the market undervalued their stocks, were at last taking some value-enhancing actions while still lamenting the absence of investor affection. Growth capex was coming down, and the downward path was already expected to continue this year before Coronavirus scrambled everyone's plans.



Since March, when U.S. economic activity halted in response to the pandemic, the energy business has rapidly altered its plans. Shale production is now expected to exit 2021 at 2.5 Million Barrels per Day (MMB/D) lower than pre-Coronavirus forecasts. Given the sharp decline rates common with shale, caused by the high initial pressure at which its hydrocarbons are released, new wells are constantly required to maintain production. Goldman Sachs estimates that last year 70% of new well capacity was offset by base declines, with only 30% feeding growth in output. As drilling activity plummets,

depletion will quickly lower U.S. production.

Future energy demand from the transportation sector is highly uncertain. Working remotely, with the daily commute now a memory, has been welcomed by many – with the possible exception of families with small children at home. Many companies are rethinking their use of expensive downtown office space. Cramming all your workers together also exposes a business to a sudden loss of an entire department to illness if an infection spreads. Dispersing your workers may become smart risk management. Client visits and business travel of all kinds may reset permanently lower. Mass transit use remains very low as other forms of travel show signs of recovery. If the perception of crowded subway trains as carrying high risk of infection persists, gasoline use may surge as commuters resort to driving. The energy requirements of moving people are changing.

The top five midstream companies have all responded to all this by reducing 2020-22 spending by almost \$3BN a year. If This 16% reduction applies across the industry, growth spending will be close to the \$32BN low of 2016. By next year it'll be \$5BN below that.

Some companies have been disciplined about requiring investments to generate a risk-adjusted return above their cost of capital. The Canadians are prominent in this group. But many have not, which is why falling growth capex is likely to be welcomed by investors. As midstream companies are faced with fewer uses for the cash they generate, investor-friendly uses such as dividend hikes and debt reduction will benefit.

It's probably no coincidence that the recovery in pipeline stocks has coincided with more modest growth spending. By lowering the need for spending on new projects, the pandemic just might provide investors with long overdue strong returns.



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# Having a Better Pandemic in Charleston, SC

On Thursday my wife and I boarded a plane from Newark, NJ to Charlotte, NC. Although Governor Murphy is slowly relaxing the lockdown restrictions that have been imposed on New Jerseyans, it is an incremental process. Each minor restoration of a freedom lost is quietly celebrated. Restaurants will soon be allowed to open for outdoor dining. Hair salons will reopen with limited capacity, but no news yet on dentists. The sequence is slow and opaque.

We're in the minority, believing living in a free country includes selecting your risks. Frequent hand washing, masks in public places and social distancing are completely reasonable and courteous. Those at high risk of serious illness are generally in well-defined groups. If you're worried, stay home. Destroying so many small business owners' life's work deserves more consideration than it's getting.

We await each new missive from the governor without much idea of their framework or schedule. Little is said of the destruction to New Jersey's already precarious fiscal outlook, but we know eventually the Coronavirus bill will come due. Expect much complaining as ruinously high property and income tax rates are tweaked even higher.

NJ has suffered around 12,000 deaths, 80% of whom were over 65. It doesn't need saying but I shall anyway, that each death is tragic and my heart goes out to every family. Related but not comparable is that 1.2 million NJ residents have filed for unemployment.

The fatalities didn't cause the job losses. We shut the

economy down to prevent more deaths. Suppose without lockdown, it would have been twice as bad. The lockdown meant 12,000 people survived who otherwise wouldn't have. Let's suppose this lucky group is also 80% over 65.

In this scenario, the ratio of jobs lost to coronavirus fatalities avoided is 100:1. Versus working age fatalities it's 500:1. These ratios have no optimal value, and some may find the concept crass. But they do seem high.

Since we long ago flattened the curve and a vaccine is a 2021 event at best, life needs to rapidly adapt to whatever new normal is.

Newark airport was eerily quiet. Everyone is required to wear a mask. The TSA estimates passenger volumes at 15% of normal, which looked about right. There was virtually no line at security, even for the non Pre-check crowd. Most airport stores were closed. Restaurants had plastic wrapped their seating to further dissuade visitors, even though no meals are on offer. It was rather sad.

On hearing we'd be flying, most friends commented on the risk of infection. Modern aircraft have HEPA air filters which are apparently fine enough to catch the virus. Fear is constraining all kinds of travel, but most have nowhere to go. Pandemic restrictions in some form are everywhere.

But the choice to endure lockdown in New Jersey from early March would have few takers. For several weeks even walking in a forest or park was forbidden. We vowed then to visit somewhere else, almost anywhere, once my wife's obligations as an online pre-school teacher were complete. North Carolina, a rental car and a plan to drive south to Charleston, SC and then beyond, beckoned.

When we exited the plane at Charlotte, two passengers walked 40 feet and sat down at the first bar they'd seen in three months.

Coronavirus has constrained life in South Carolina too. Museums are closed, but restaurants are open for indoor seating with socially distanced tables. As we were walking through historic Charleston, we excitedly pointed through a window at four people sitting at a restaurant table indoors. The diners looked back, regarding us with some amusement.

South Carolina has less than a fifth as many cases as NJ, and 8% of the fatalities, adjusted for population. Of course, NJ has fared worse than anywhere except neighboring epicenter New York City. So just traveling away from NJ was likely to be an improvement.

Visitors to Charleston are way down. Our original hotel reservation was canceled because the owners suddenly decided to carry out renovations.



Nonetheless, life in Charleston is more agreeable and probably our new normal. We ate our first meal out in three months. Tables were generously distanced and the waiter wore a mask. Turns out he and his girlfriend fled Queens, NY two months ago. We understand.