

Impacts and Implications of COVID-19 for the Energy Industry

ASSESSMENT THROUGH MID-OCTOBER 2020

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Purpose and Caveats

This report provides an update to our [prior assessments](#) of the impacts of COVID-19 on electric and natural gas utilities that began in early April. Like those prior reports, this compilation is a review of many sources of information, with public health, economic, and industry data changing considerably day by day. The goal is to make a broad overview of energy industry implications available in one document, rather than to offer a detailed forecast or opinion. Data sources are considered reliable but have not been independently validated by Brattle. Doubtless, some important sources of information have been overlooked.

The scope of the pandemic is all too familiar, but the geographic pattern of it has shifted towards the middle of the country, with corresponding changes in financial stresses and risks.

The economic suffering from the pandemic has been mitigated to some extent by public monies for income replacement and by various moratoria on payment of utility bills, rents, and some loans – but many of these programs are declining or expiring at the same time as a possible surge of COVID-19 cases. There is a risk that the relatively successful economic coping to date may unwind, and financial hardships on individuals and corporations will increase, if we cannot stabilize pandemic problems fairly quickly.

Utilities have been asked and able to bear some of this risk so far, but deferred cost recovery mechanisms may themselves be strained if the pandemic worsens or lasts too long.

Agenda

1. COVID-19 Path and Macroeconomic Projections
2. Energy and Financial Sector Impacts
 - Oil & Gas demand and prices
 - Electricity loads, load shapes, and prices
 - Generation mix impacts
 - Regulatory reactions
 - Financial Impacts on earnings, stock prices, and risk
3. Potential future economic risk
4. Key Takeaways

Frame of reference: We have treated February 1, 2020, as the beginning of the significant influence of COVID-19 on the U.S. economy. Energy data has not been weather-normalized, so we use (where relevant) the average of a few years' prior history for comparison.

Executive Summary

- U.S. continues to have both the highest number of cumulative confirmed cases and deaths in the world, as COVID-19 has spread across the country to hit previously lesser affected areas like **Midwestern states** emerging as **COVID-19 hotspots**.
- **Oil prices are holding steady near \$40/bbl** (spot), about \$20 below pre-COVID levels, as uncertainty about the pace of economic recovery persists. Transportation fuel, a significant source of **oil demand, remains below pre-COVID-19 levels**. For example, global airline traffic is expected to have declined by 66% in 2020 versus 2019.
- U.S. natural **gas storage inventories are near record highs, but lower production and higher LNG export demand** are putting upward pressure on gas futures. January 2021 Henry Hub futures are at \$3.27/Dth, up 13% (\$0.37/Dth) since July.
- **Electric load across ISOs in the U.S. declined by 7% in September 2020** compared to the average September of the four previous years – dropping to levels seen in April and May when the pandemic first struck. The majority of this reduction is coming from PJM and MISO, with CAISO and ERCOT seeing almost no net reductions.
- COVID-19 utility service **disconnection moratoriums had expired in 20 states by October 2020**, however many states are likely to extend them. Collection mechanisms for deferred amounts are yet untested dates.
- **Electric utilities** on average have experienced **revenue reductions smaller than total load reductions** (likely due to price structures and cost recovery mechanisms), and have even shown a **Q2 increase in earnings** due to cost cutting. *This outcome may not be sustainable*, especially if defaults arise from COVID-19 in coming months.
- **Utility stocks' recovery has trailed the S&P 500**, remaining relatively stagnant throughout the summer versus S&P 500's growth of 10%. There is some concern that the market may be precariously over-priced unless COVID conditions stabilize.
- After rising sharply in the early months of the pandemic, **electric utility daily betas have now decreased by 30%**, reaching 0.74 on average (down from around 1.0 in June).

COVID-19 Path and Macroeconomic Projections



Economy-Wide Drop and Recovery? Disease Outlook

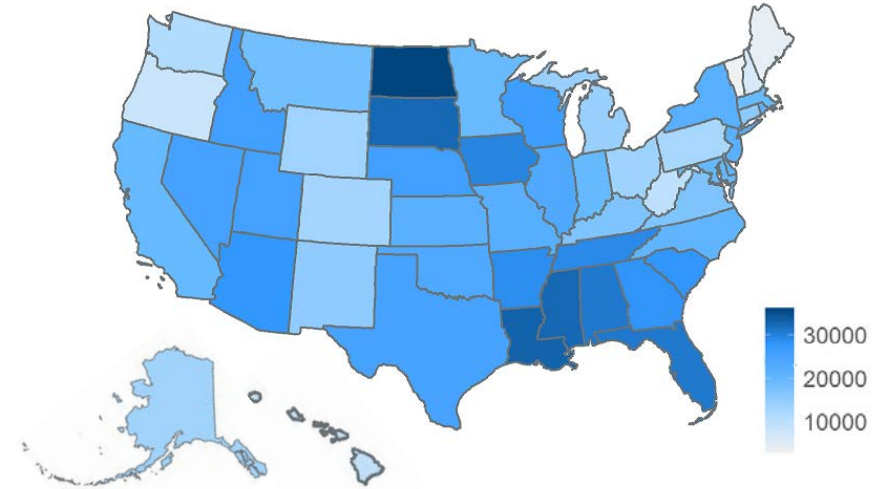
The U.S. continues to have both the highest number of cumulative confirmed cases and deaths in the world, at over 8.4 million and 223,000 respectively as of mid-October.

- As of mid-October, North Dakota is the state with the highest number of infections per capita, while New York and New Jersey have the highest number of deaths per capita.¹

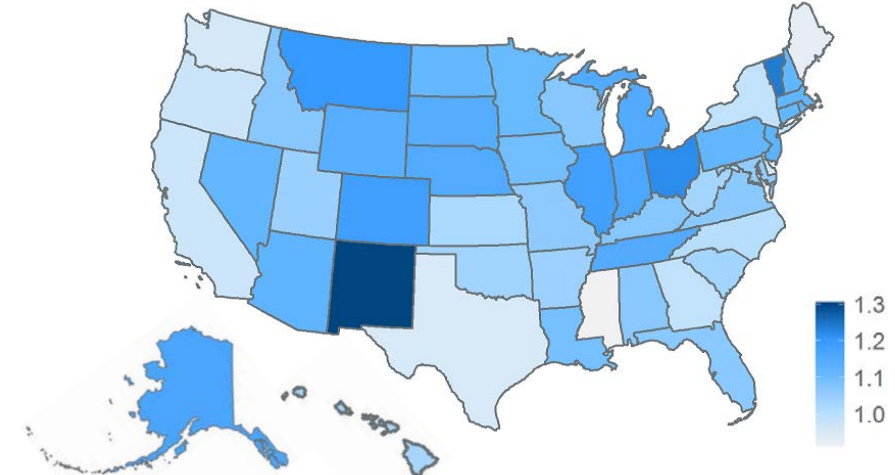
Several midwestern states are emerging as the new COVID-19 hot spots as we transition into the Fall.^{2,3,4}

- As of October 17, the rate of transmission was highest in New Mexico at 1.31 and lowest in Mississippi at 0.91.⁵

Confirmed Cases per 1 Million People as of October 17¹



COVID-19 Mean R_t as of October 17⁶

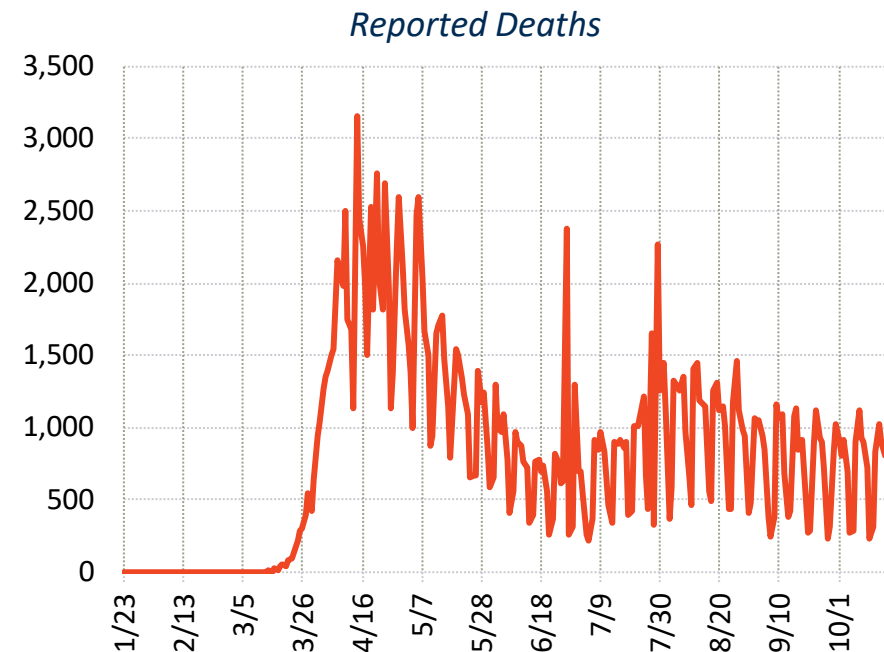
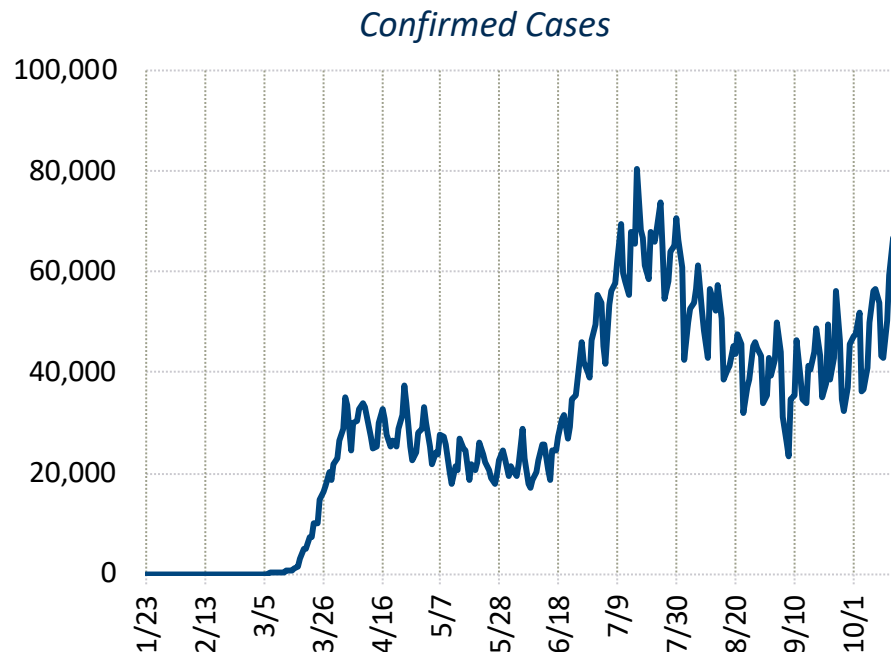


Economy-Wide Drop and Recovery? Disease Outlook

Daily COVID-19 infections in the U.S. had previously peaked in mid-July at over 80,000, with a total of over 1.9 million, or 24%, of all new confirmed cases in that month alone.

- August and September both averaged approximately 20% fewer infections than the preceding month.
- Daily confirmed cases had started to decline but are on the rise again, with **over 85,000 cases (a record high) on October 23rd** leading to the highest seven-day average since the pandemic began.⁷

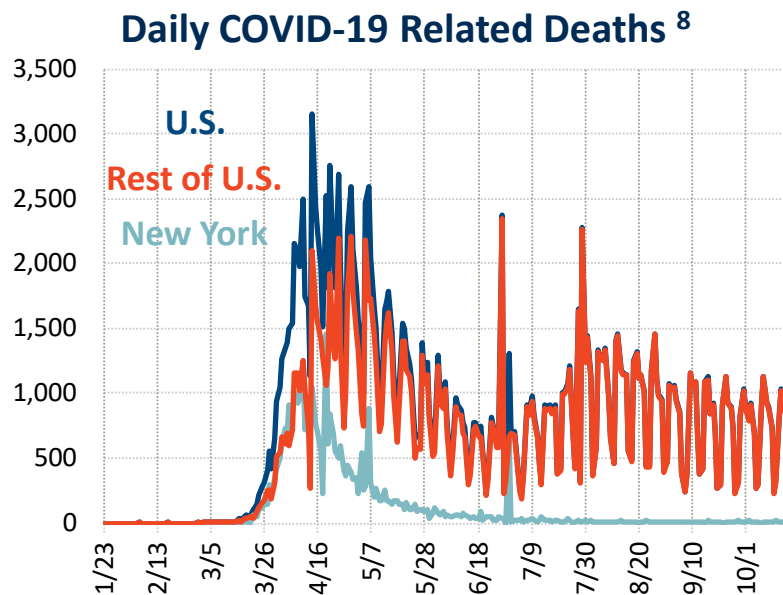
Daily COVID-19 Related Statistics in the U.S.
through October 17⁸



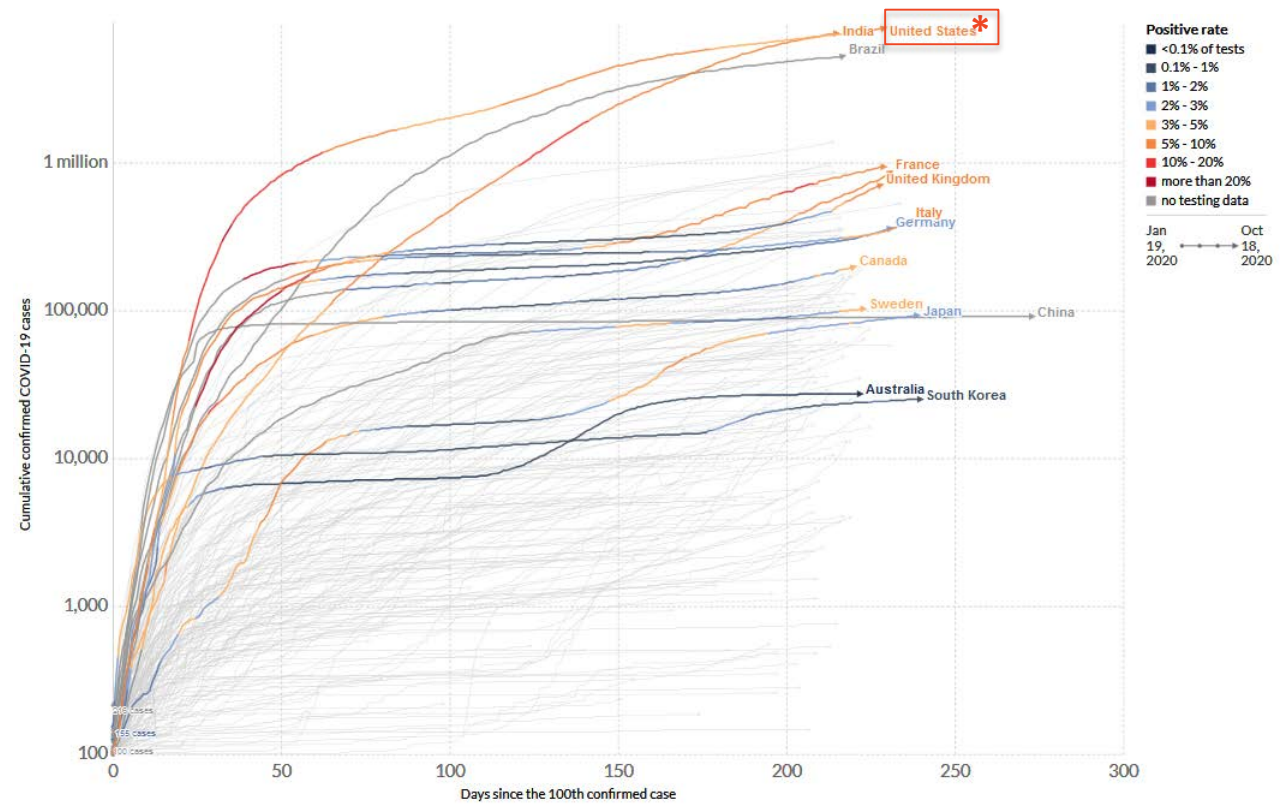
Stabilizing or Still Growing?

The U.S. has suffered more than 20% of worldwide cases and deaths but has less than 5% of the population.⁹

- The U.S. daily death rate declined from a high of over 3,100 in April, but has not decreased in the past month, fluctuating between 250 and 1,100 on any given day.⁸
- The infections' doubling time has also declined (~10–20 days), but is still higher than average on a global scale and locally higher in some states.



Growth in Number of Confirmed COVID-19 Cases since Inception ¹⁰



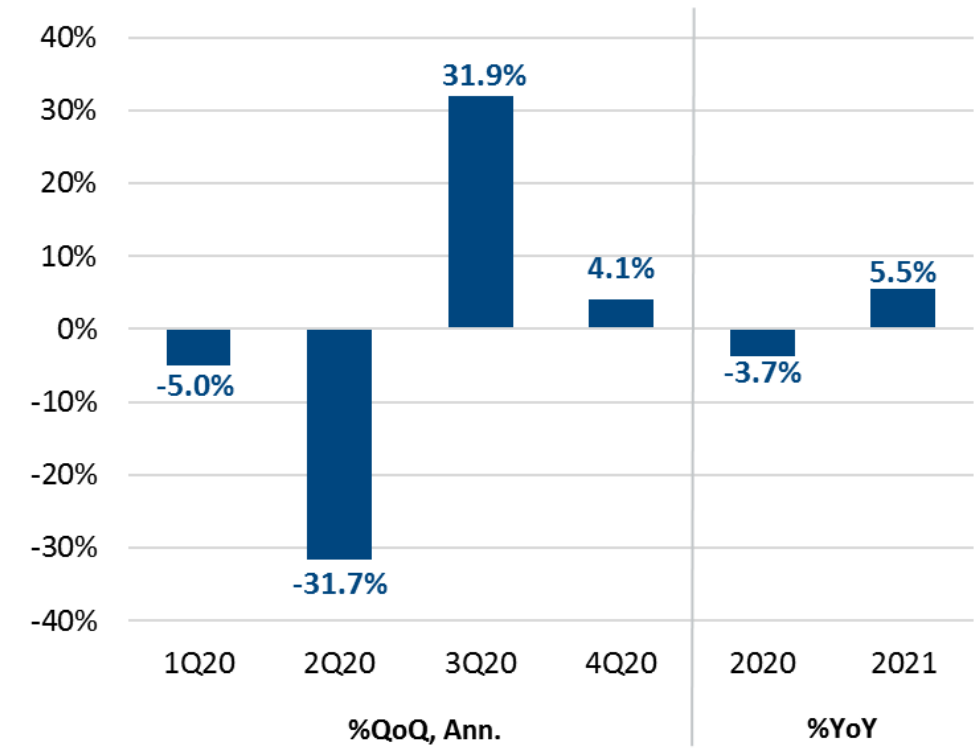
Source: The Visual Capitalist, data as of October 18, 2020.

Economy-Wide Drop and Recovery?

Many GDP forecasts continue to project a significant Q3 2020 rebound, with sustained growth thereafter through 2021.¹¹

- Year over year, **Goldman Sachs** forecasts an overall 3.7% GDP reduction in 2020, followed by 5.5% annual growth in 2021.¹¹ This compares to a larger 4.2% drop expected in June this year, with a 5.8% recovery then seen for 2021.¹²
- As of its most recent economic update from July, the CBO predicts a year-over-year decline of 5.8% in real GDP for 2020, followed by a 4% recovery in 2021.¹³
- Similarly, the Fed forecasts a 3.7% reduction for all of 2020, with a recovery of 4% in 2021.¹⁴

U.S. Real GDP Growth Forecasts ¹¹

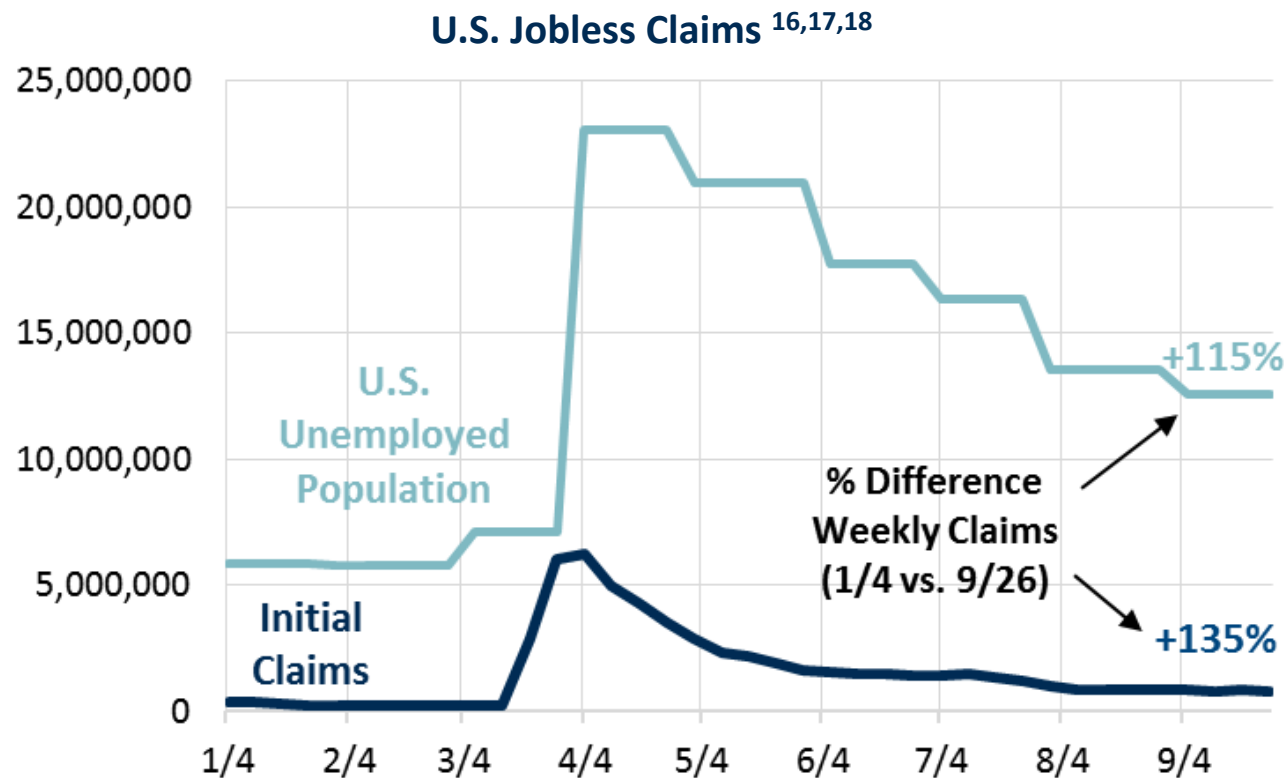


Source: Goldman Sachs Investment Strategy Group.

Economic Impacts on Individuals

With U.S. total jobless claims nearly double begin-of-year levels, there is concern regarding personal and commercial limits on ability to endure continuing economic hardship.¹⁵

- Initial monthly unemployment claims have decreased since April, but the *CBO forecasts that unemployment will decline only very slowly over the coming decade* from about 10% to 5%, averaging 6.1% through 2030. All of these years would be well above the pre-pandemic levels of 3.7%.¹³



A resurgence of COVID-19 that may occur in the coming colder months could reverse improvements to date (see slide 43).

Energy and Financial Sector Impacts



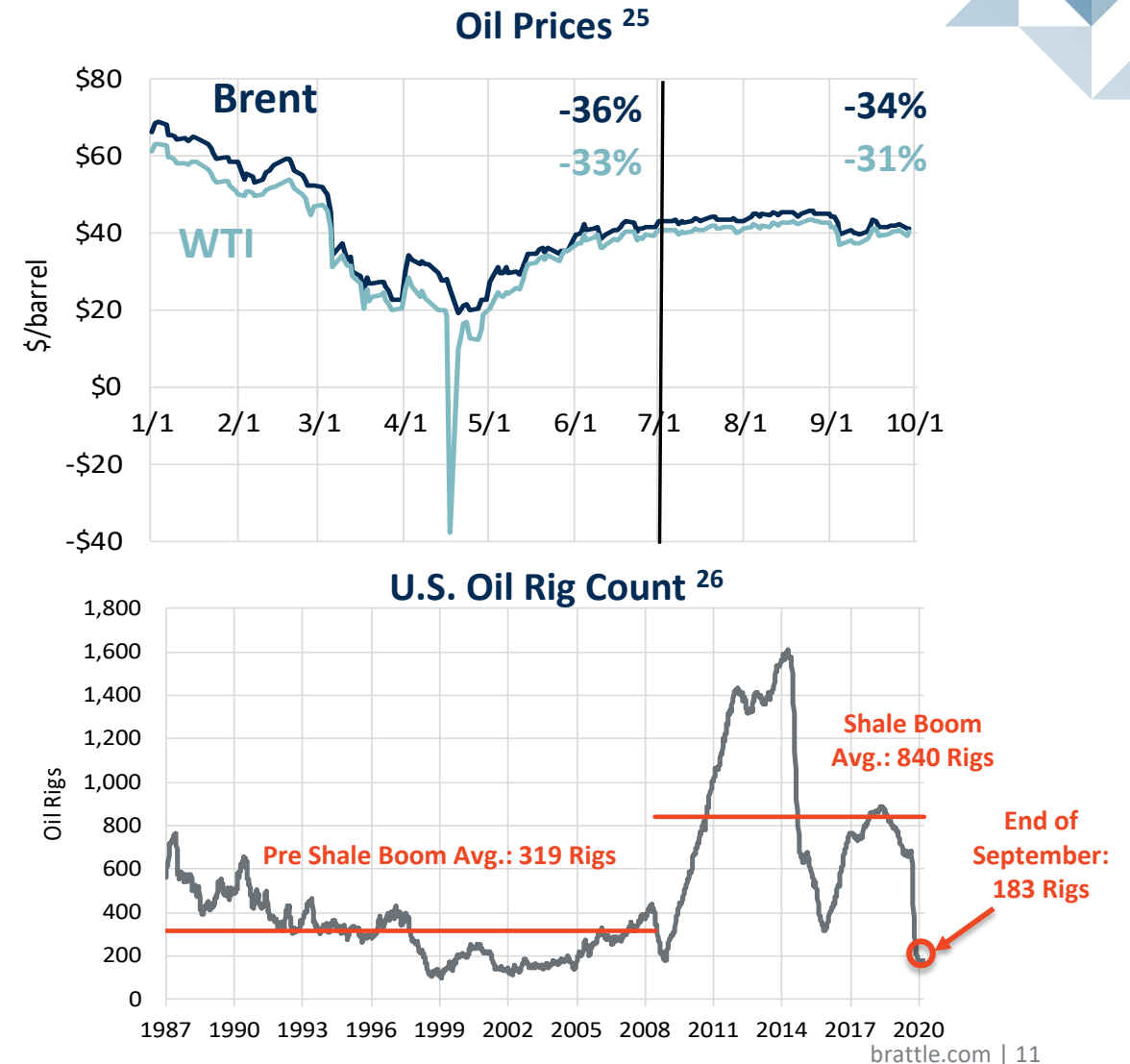
Oil – Spot Prices and Forwards

After dropping to around \$20/bbl in April, spot oil prices have remained around \$40/bbl since July.

- Demand for transportation fuels has stalled, putting pressure on oil prices.
 - Transportation fuels account for 68% of US oil demand¹⁹ and about 55% of global oil demand.²⁰ (Of which: 55% light-duty vehicles, 24% commercial and freight trucks, 10% aircrafts; 5% boats, 6% other).²¹
- US storage levels remain elevated at 13% above 5-year range.²²
- China has reduced purchases by 50% since May after buying 73 MMBbl earlier in the year, capitalizing on low oil prices.²³

U.S. oil rig count has declined to levels not seen since the pre-shale oil drilling era.

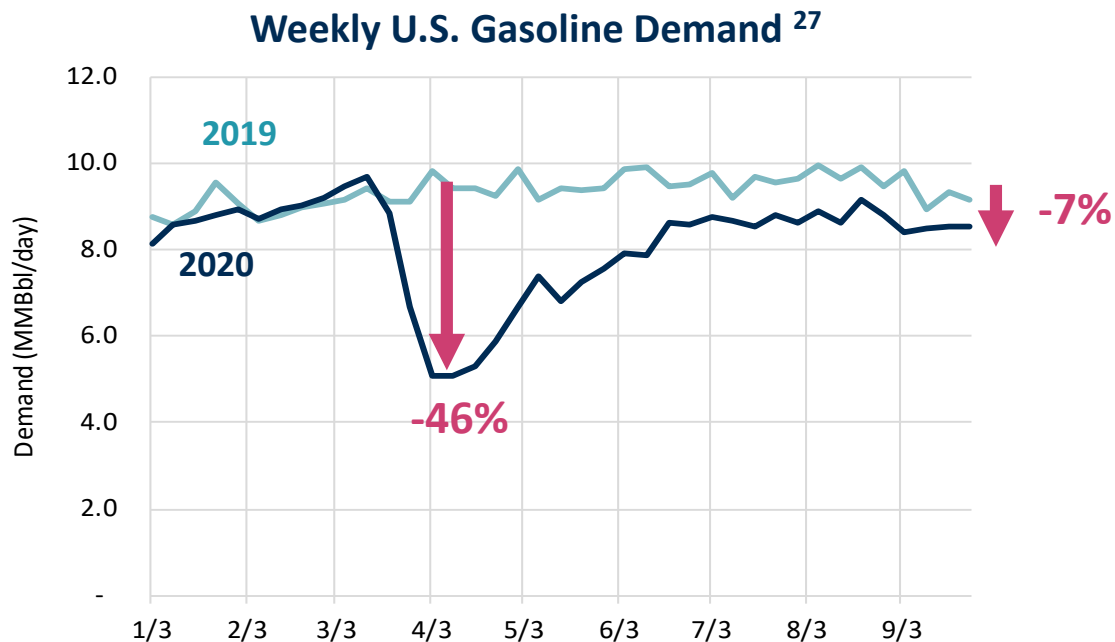
EIA expects global oil consumption to be down about 9% (8.6 MMBbl/day) in 2020, but recover by 7% (6.5 MMBbl/day) in 2021.²⁴



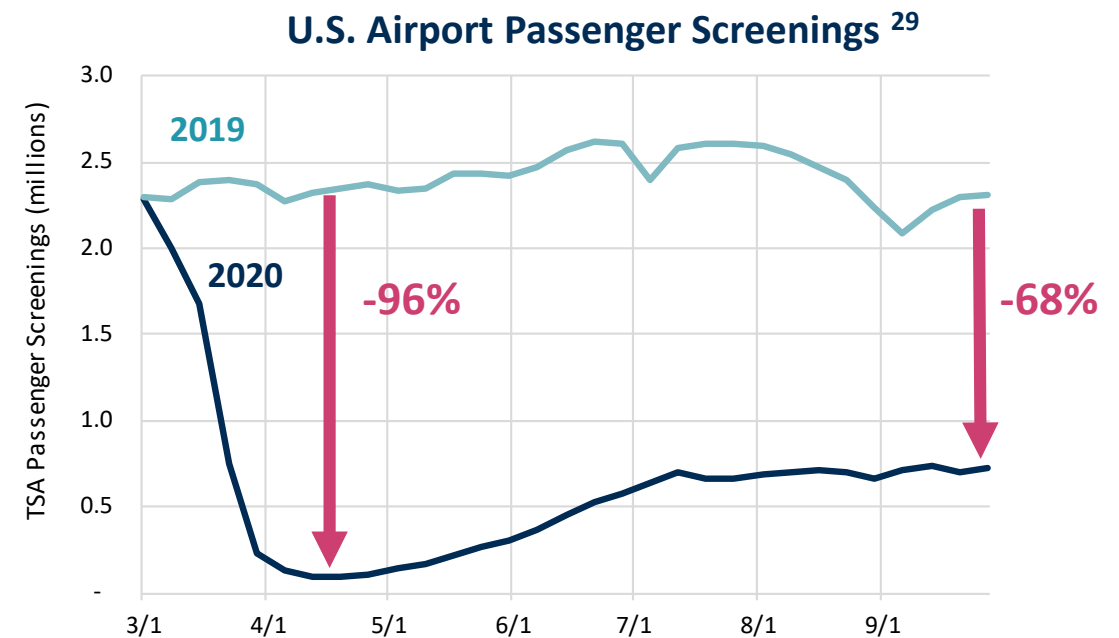
U.S. Mobility Trends

Air and motor vehicle traffic has stalled in recent months.

- Gasoline demand remains 7% below last year, likely due to continued work from home policies
- Retail gasoline prices at the end of September are 17% lower year-over-year.²⁷
- Airline passenger traffic remains 68% below last year's levels as major airlines begin to layoff 50,000 workers.^{28, 29}
 - The International Air Transport Association (IATA) forecasts a 66% decline in global air traffic in 2020.³⁰



Source: EIA, accessed September 29, 2020.



Oil Futures

Recovery of oil futures has stalled due to demand uncertainty and stalling economic recoveries world wide.

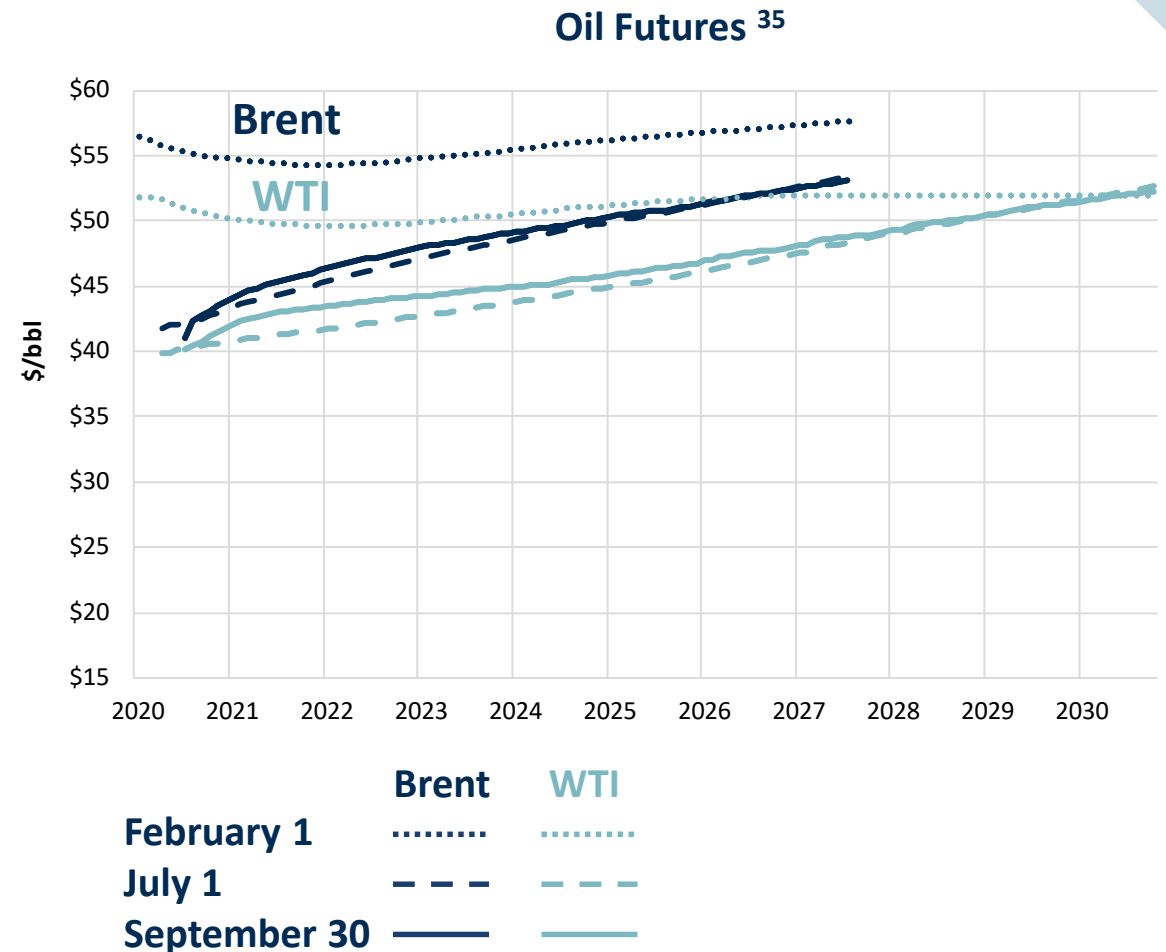
- Brent and WTI increased by 1-2% relative to July.
- Investors continue to signal oil will not cross \$50/bbl until 2024 (Brent) or 2028 (WTI).

Resurgent COVID-19 cases and resumption of partial ockdowns creates downside risk for oil prices

- Paris³¹ and Madrid³² have imposed tighter restrictions, with the UK also considering similar measures.³³

OPEC+ has cut production by 7.7 MMbbl/day through the end of the year.³⁴

- Approximately 8% of global demand
- Initial production cut in May was 9.7 MMbbl/day



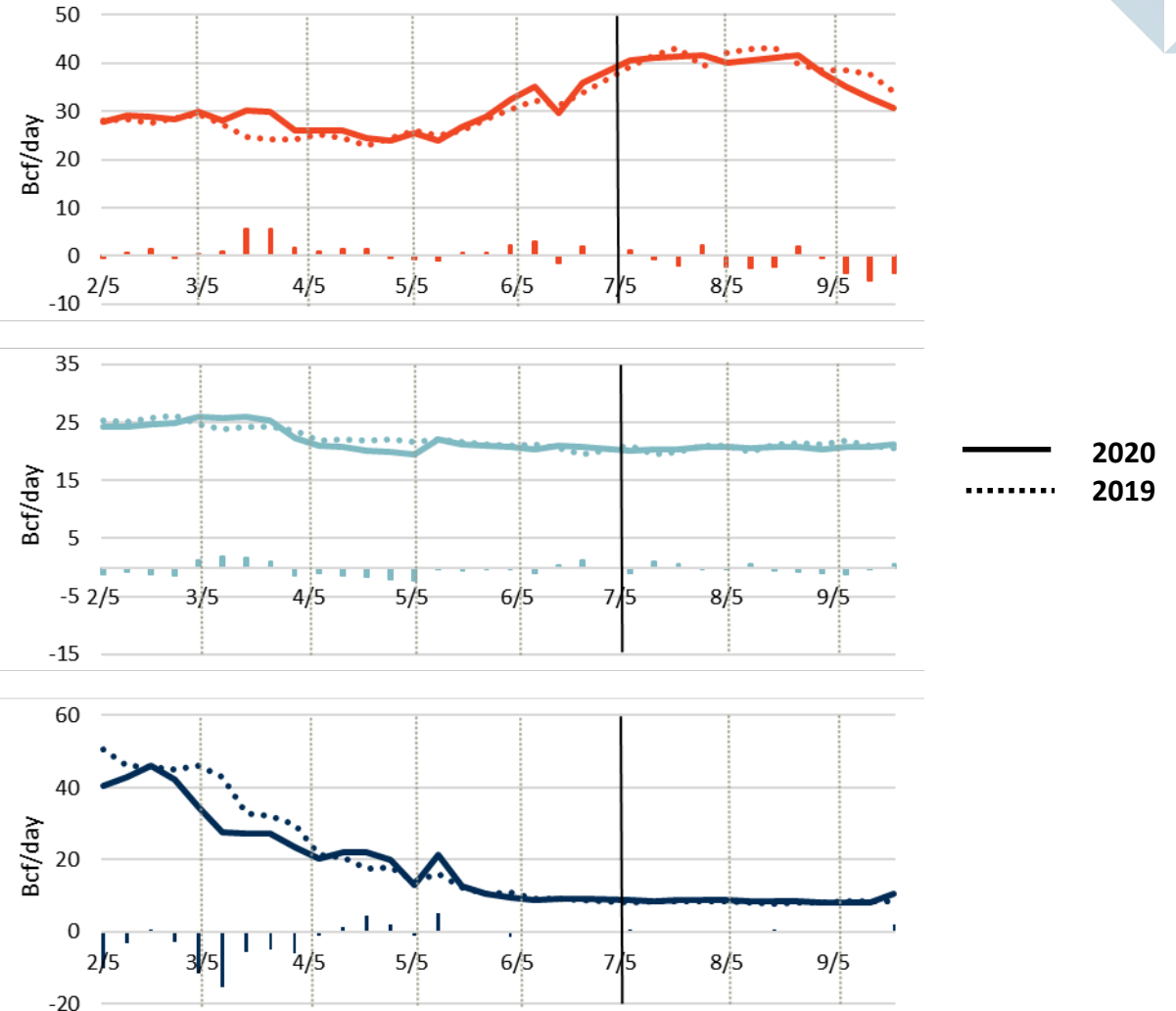
Natural Gas – Demand

Natural gas demand has only been modestly affected by COVID-19.

- Natural gas for **power generation** decreased in September due to milder temperatures, with average monthly power demand 9% below last year.
- In May and June, **industrial demand** remained in line with 2019 levels, recovering from a maximum decline of 7% in April.
- **Residential & commercial demand** remain relatively flat and in-line with 2019 levels due to summer temperatures.

However, spring and summer are not times when gas markets are normally strong anyway. The winter may be a better test.

Natural Gas Demand – 2020 vs. 2019 ³⁶

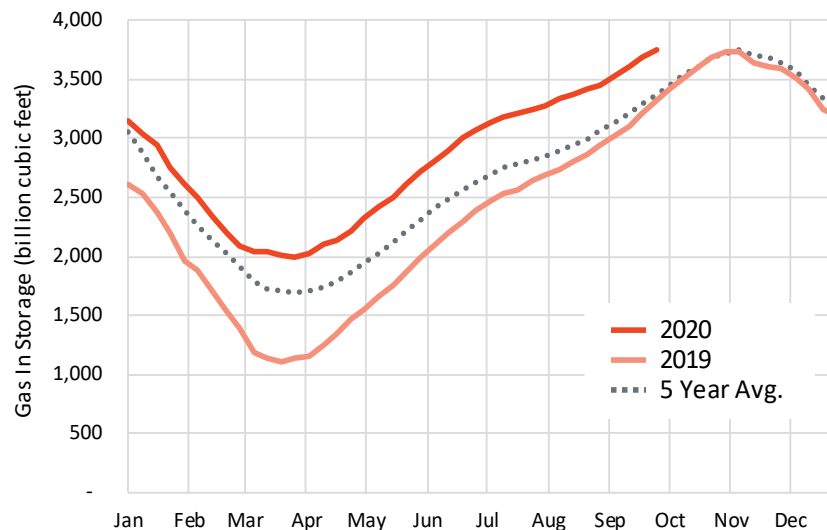


Natural Gas – Storage Levels

U.S. storage levels are at multi-year highs, whereas rising demand in Europe has slowed storage injections.

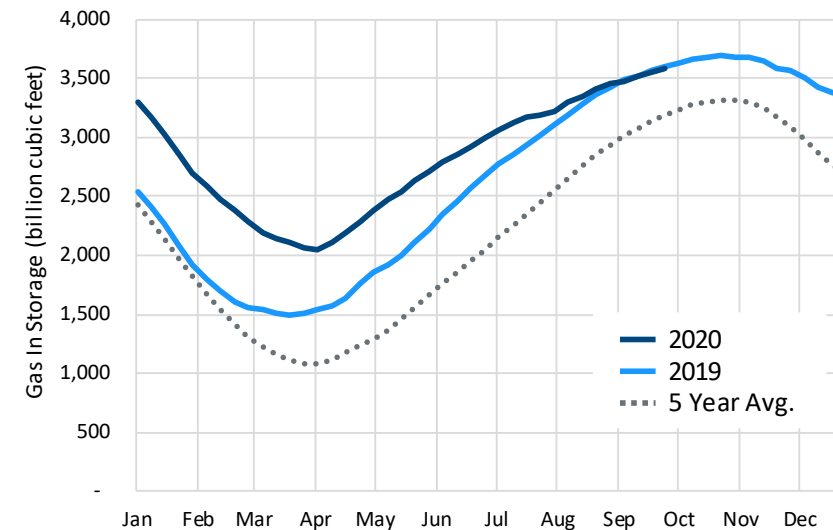
- Weaker US power demand combined with LNG export facility outages (maintenance and Hurricanes) has pushed storage levels to 3,756 Bcf – higher than 2019 and 5 year average inventory levels.³⁷
- EIA estimates inventories will be at a record level of over 4.0 Tcf at the end of October.²⁴
- Easing of COVID-19 restrictions combined with nuclear outages increased demand and natural gas prices in Europe.
- European natural gas storage is currently at 95% of total capacity, similar to 2019 levels.³⁸

United States³⁷



Sources: Gas Infrastructure Europe, U.S. EIA.

Europe³⁹



Natural Gas – LNG

U.S. LNG export outlook has improved since summer lows.

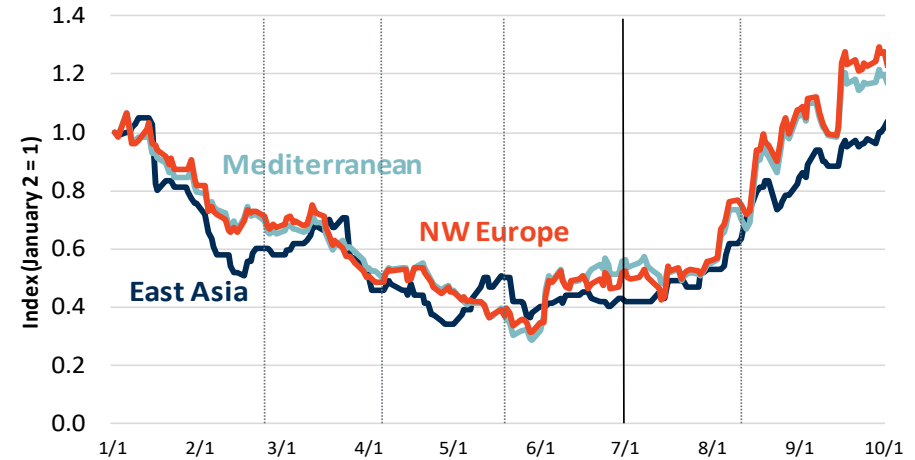
- Improvements in global economic activity combined with nuclear outages in Europe and Asia have increased global demand for LNG. ⁴⁰
- Approximately 5 cargoes expected to be cancelled in November, way down from 45 cargoes in July. ⁴¹

Prices in Europe are 20% higher than begin of year levels, leading to an increase in US LNG exports

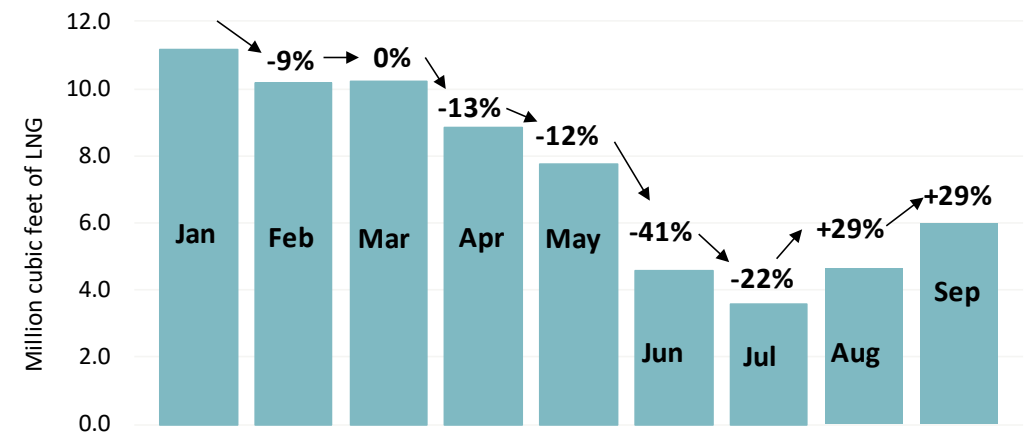
On August 27, Hurricane Laura took two of six major U.S. LNG Export facilities offline—Cameron and Sabine Pass—reducing LNG export capacity by 4.9 Bcf/day. ^{41,42}

- Cameron LNG returned to service in early October
- Sabine Pass returned to service in early September
- Hurricane Delta in early October resulted in another shut-down, but impacts were minimal compared to Laura. ⁴³

LNG Spot Pricing ⁴⁴



Monthly U.S. LNG Shipping Exports (Jan-Sep 2020) ⁴⁴



Natural Gas – Futures

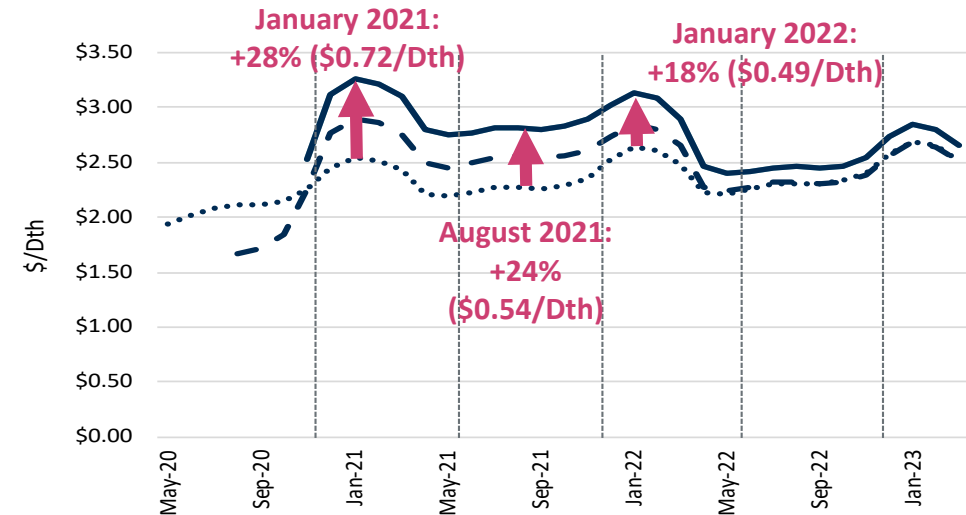
Although storage is near record highs, lower US gas production could draw down inventories faster if colder weather materializes this winter

- EIA estimates that US natural gas consumption will be down 1.8% (1.5 Bcf/day) in 2020 vs. 2019.²⁴
- U.S. production expected to decline 2.7% (2.5 Bcf/day) in 2020 vs. 2019.²⁴

Forward curve through March 2023 has increased on average by 23% (\$0.55/Dth) on average since February and 11% (\$0.29/Dth) since July.

Speculative traders have increased their long position on natural gas futures on expectations of recovering economic activity leading to higher US energy consumption and higher LNG exports.⁴⁵

Henry Hub Futures ⁴⁶



February 1
July 1
September 30

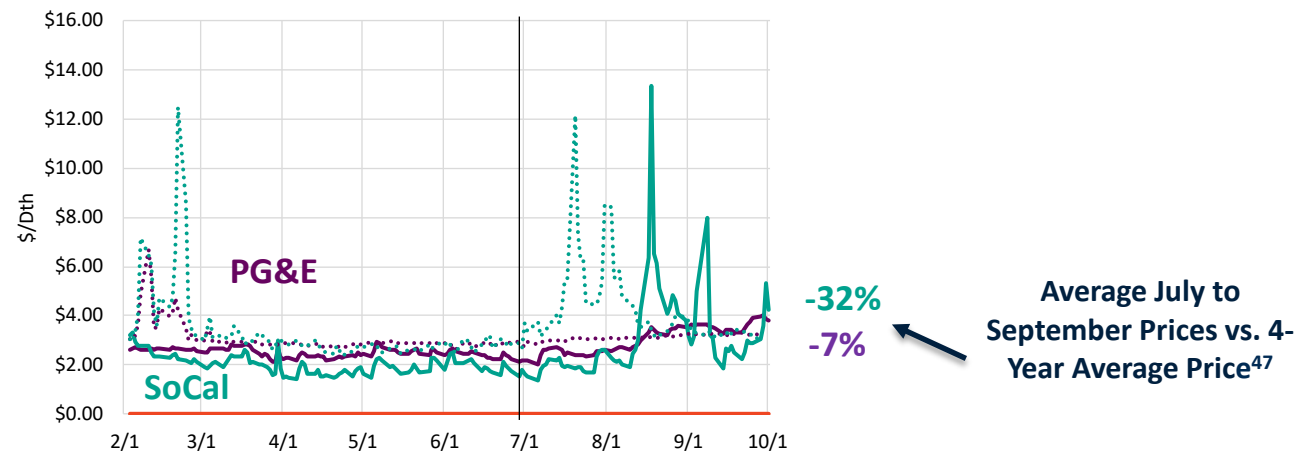
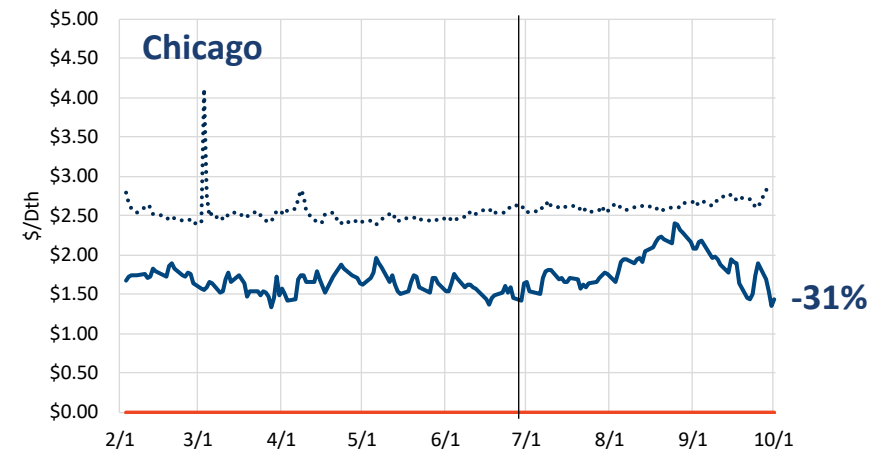
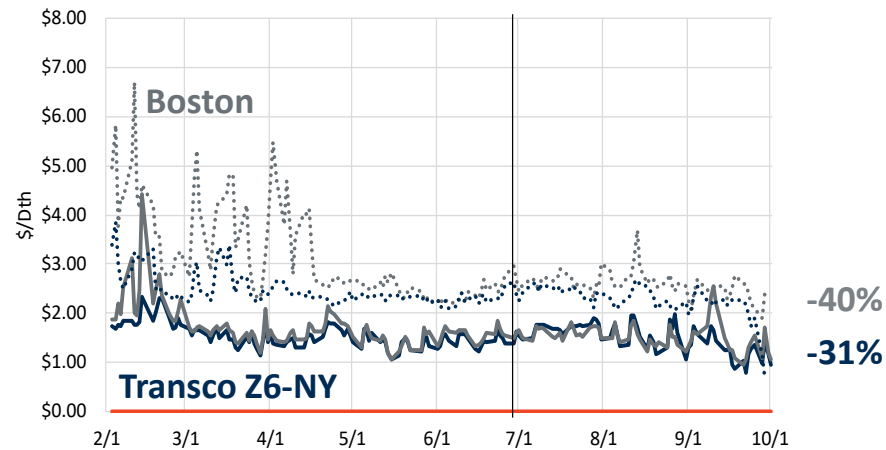
Henry Hub

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	January 2021	August 2021	January 2022
Feb to Sep 2020	+28% (\$0.72)	+24% (\$0.54)	+18% (\$0.49)
Jul to Sep 2020	+13% (\$0.37)	+10% (\$0.26)	+10% (\$0.29)

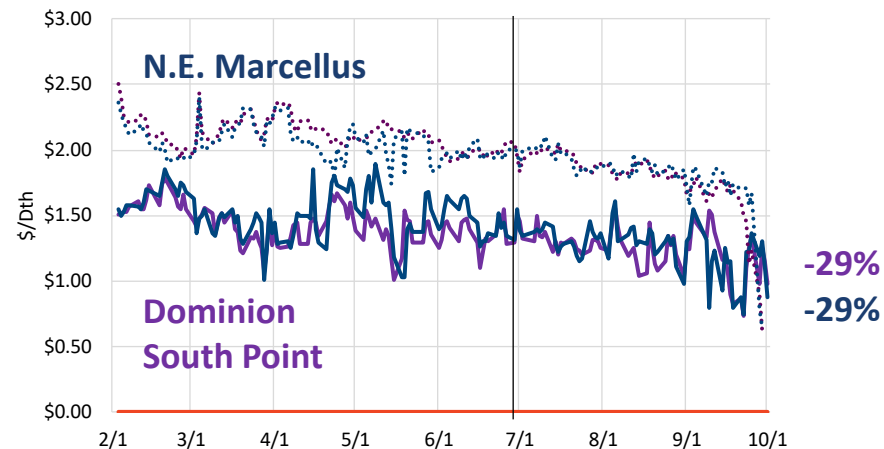
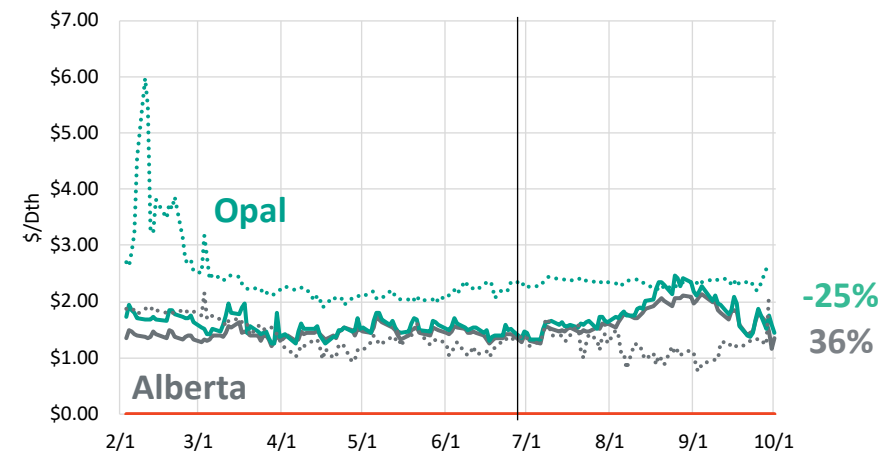
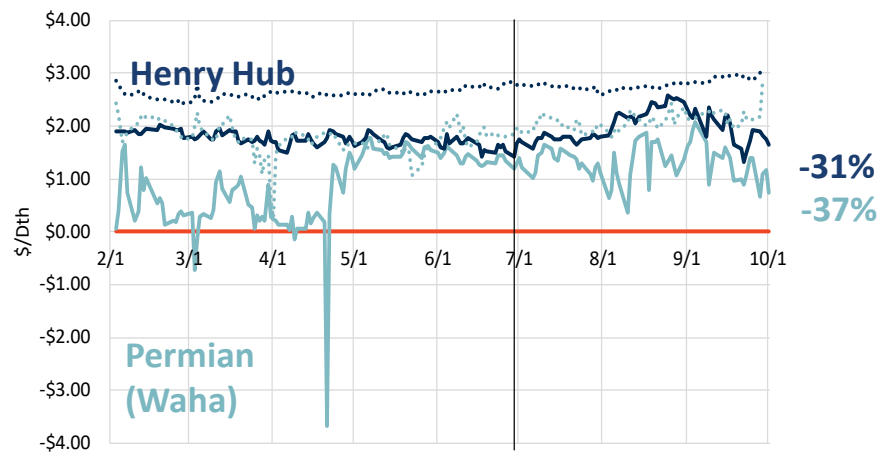
Natural Gas – Demand Area Spot Pricing

Weaker summer demand puts downward pressure on major city-gate pricing hubs relative to historical averages.



Natural Gas – Supply Area Spot Pricing

Supply area prices remain weak due to high storage levels and lower summer demand; Henry Hub reached 9-month high due to production cuts from Hurricane Laura.⁴⁸



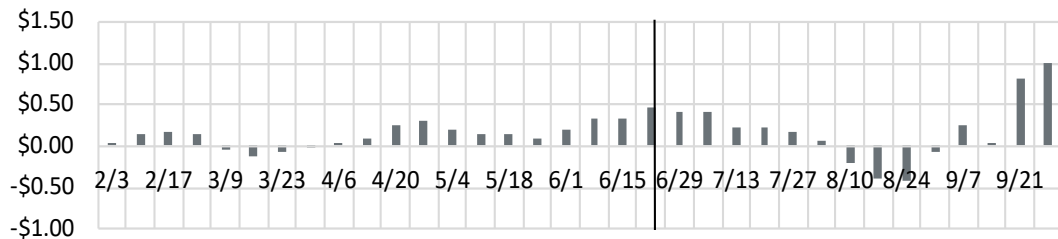
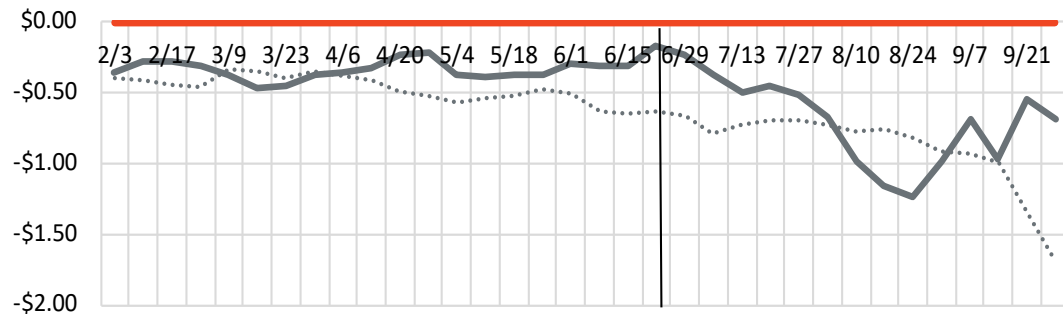
Average July to
September Price vs. 4-
Year Average Price⁴⁷

Natural Gas – Weekly Basis Differentials

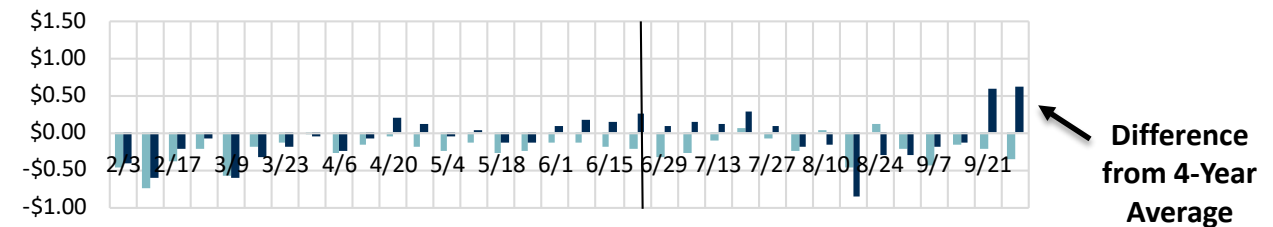
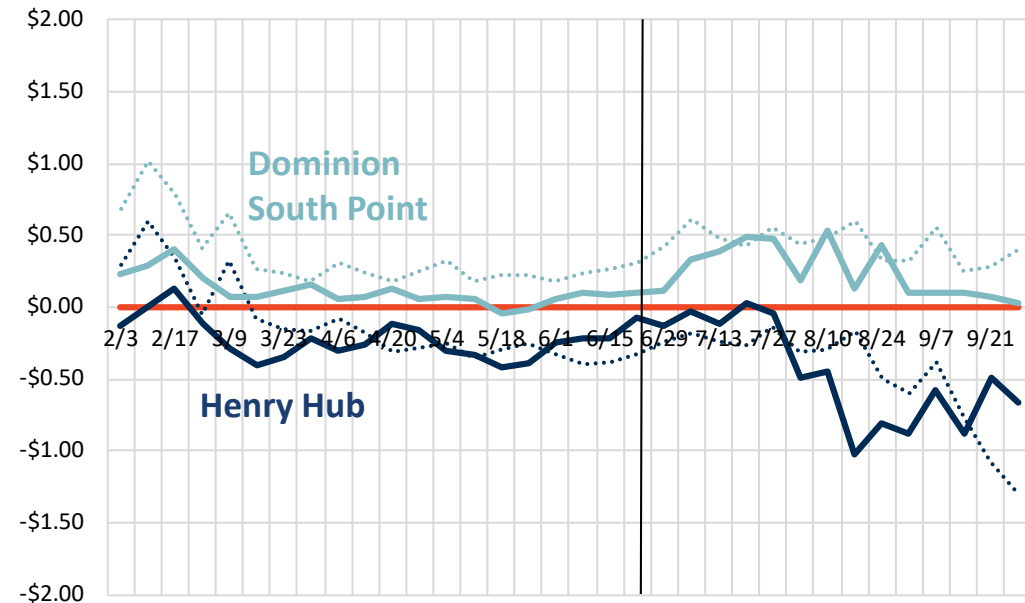
High storage inventories and lower demand is causing Northeast gas to trade at a steeper discount to Henry Hub

Mild Northeast temperatures causing flat basis between New York City and Dominion South Point.

Henry Hub to Dominion South Point ⁴⁷



Basis Differentials to New York City ⁴⁷



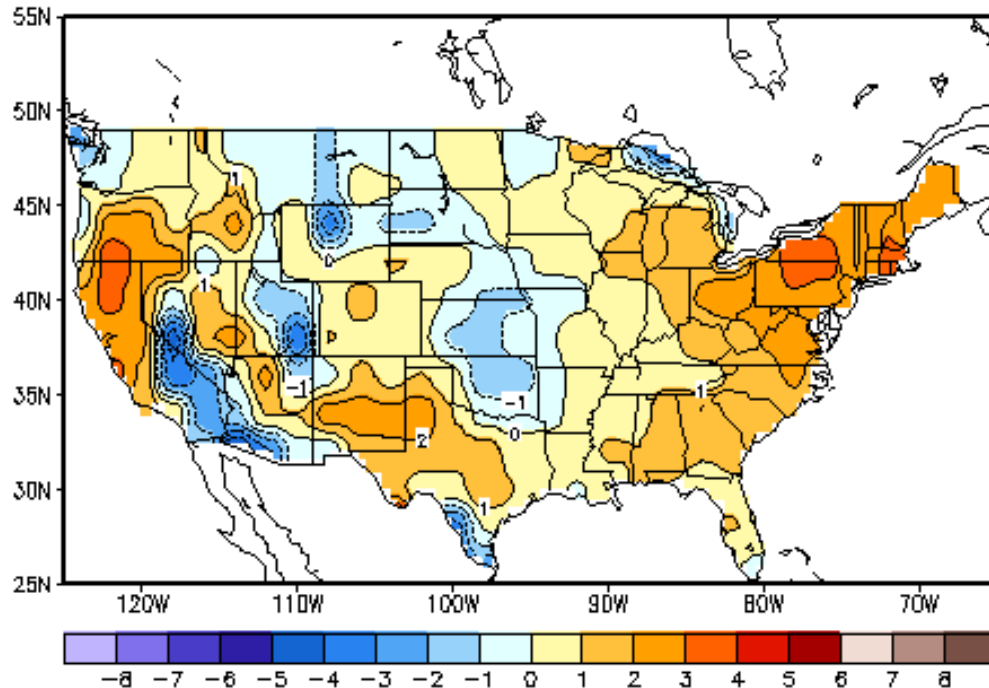
Spreads Calculated as: Destination - Origin

Weather

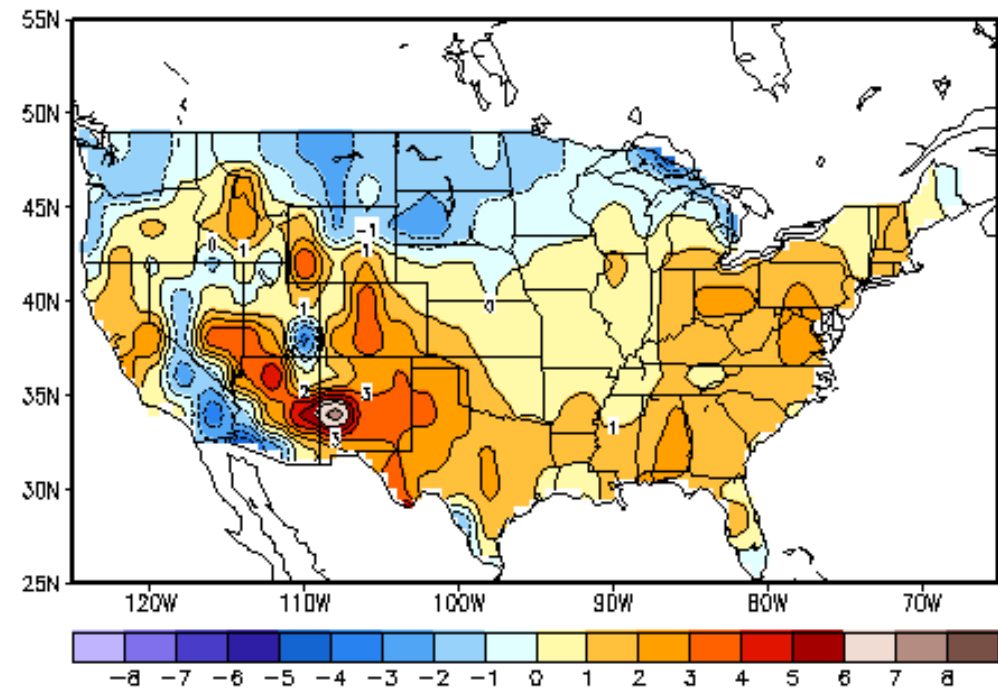
Summer 2020 temperatures have been largely in line with Summer 2019 temperatures; Northern California, New England, and Western New York saw warmer temperatures.

Deviation between Average Actual and Normal June 15 to September 15 (°F) ⁴⁹

2020



2019



Source: National Weather Service Climate Prediction Center.

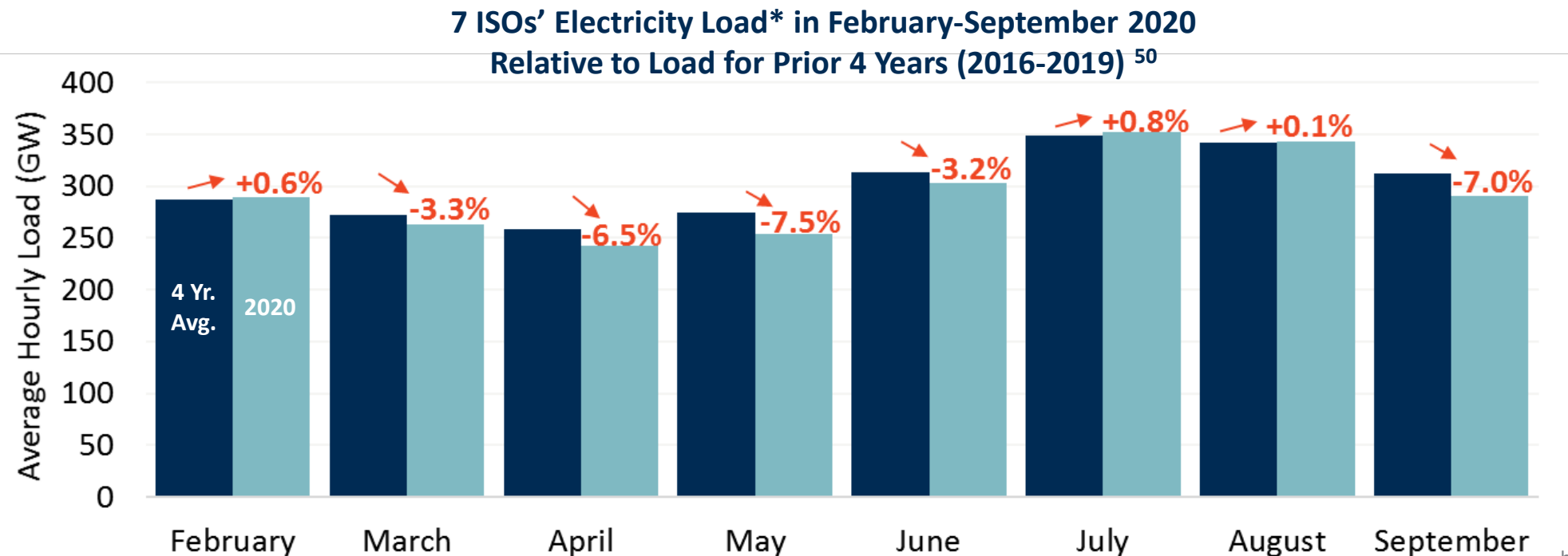
Normal is 1981 to 2010 monthly average climatology

Impact on Regional Electric Loads

Compared to the prior 4 years, September 2020 average hourly power loads for the seven major ISOs* dropped 7%, almost double the 3.2% monthly reduction experienced at the beginning of summer in June.

- The load reduction in September was about the same as May levels (~-7%), the majority of reduction occurring in MISO and PJM, areas in which COVID-19 intensity grew dramatically from midsummer to the present.

The EIA forecasts that 2020 electricity consumption will drop by 2.2% relative to 2019 (based on a 3.2% increase in residential sales, a 6.2% drop in commercial sales, and a 5.6% drop in industrial sales).²⁴



Note: *CAISO, MISO, ISO-NE, NYISO, PJM, ERCOT and SPP; collectively, these ISOs represented approximately 55% of total U.S. load in February through July 2019.^{51, 52}

Impact on Regional Electric Loads

The U.S. ISOs generally are reporting smaller reductions in load through the summer than in the spring, due to easing of COVID-19 restrictions (ERCOT reductions unchanged; ISO-NE trending towards expectations; SPP back to pre-pandemic levels).

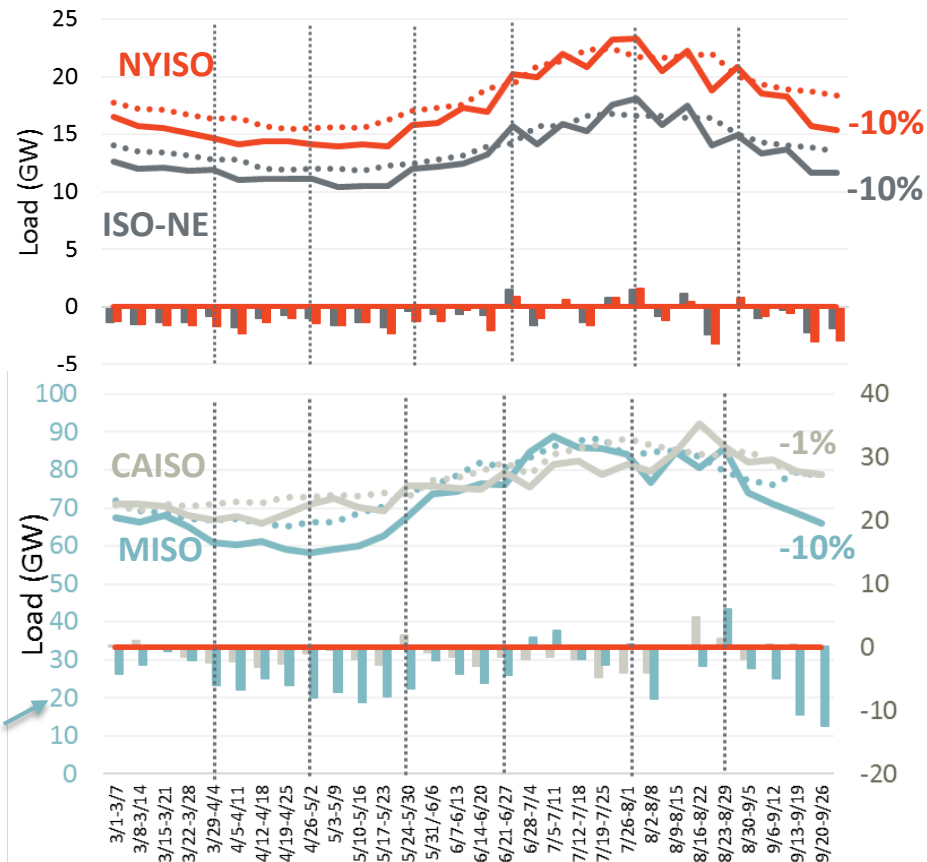
Estimates of Load Reduction due to COVID-19 ^{24,53,54,55,56,57,58,59,60,61}

PJM	PJM reports: load impacts eased through the summer, but showing signs of re-emerging as the effect of heightened weather sensitivity fades; total energy use down 4.1% in July & August and 4.9% in September; weekday peak down 1.9% in July & August and 3.4% in September.
CAISO	CAISO reports: since the beginning of stay-at-home orders, weekday average load reductions of 2.4% (up to 5.0% in peak hours); weekend average load reductions of 1.1% (up to 1.9% in peak hours) through July; heat waves in August and September.
ERCOT	ERCOT reports: no COVID-19 impacts on daily peak demand during the summer; weekly energy use down 1%.
MISO	MISO reports: lower load reduction of 1.5% and 1.3% in July and August , respectively (compared to 5.1% in June) due to lifting of restrictions and reopening of manufacturing and retail; change in load shape due to COVID-19 related measures.
ISO-NE	ISO-NE reports: air conditioning load from warmer weather and limited expansion of re-opening policies resulted in higher loads than would be expected in June through August; actual load continues to trend toward what would be expected in the absence of COVID-19 through the first week of October.
NYISO	NYISO reports: decline of overall energy use by 3-5% in the first week of July, 0-2% during the rest of the summer, and 2-4% in mid-September; peak demand down 2-3% in August and 4-5% in mid-September; reduction in electric demand from commercial customers leading driver of overall reduced electricity consumption.
SPP	SPP reports: system has largely returned to pre-pandemic levels , with average or above-average load on the aggregate consistently since late June.
U.S. Overall	<p>EIA predicts 2.2% less electricity consumption in 2020 relative to 2019.</p> <p>-6.2% decline for commercial sales</p> <p>-5.6% decline for industrial sales</p> <p>-3.2 increase for residential sales</p> <p>EIA also forecasts 10% decrease in energy-related CO₂ emissions in 2020 (relative to 2.8% in 2019).</p>

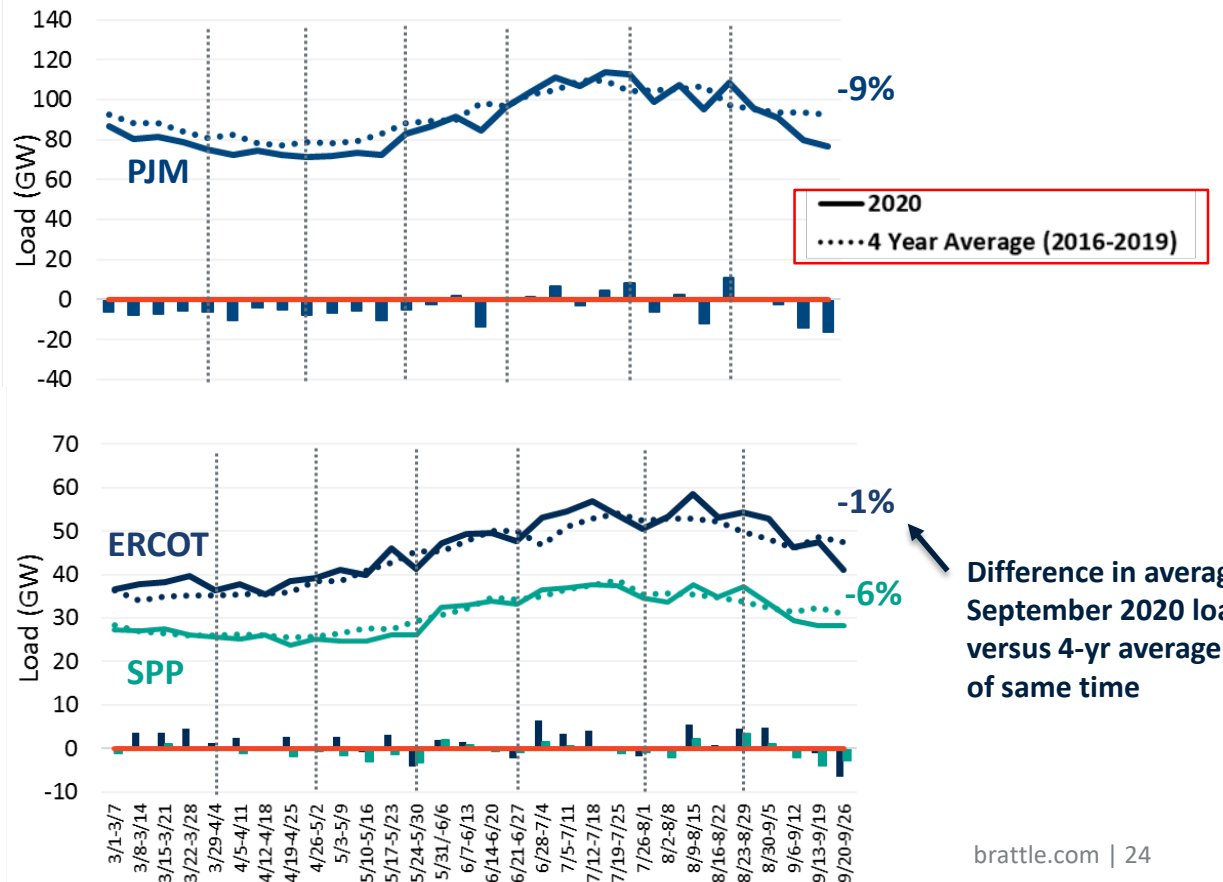
Impact on Regional Electric Loads

Generally, U.S. ISOs have shown little or no % load losses despite COVID-19 throughout the summer, but with a drop in September in NYISO, NE, PJM and MISO compared to prior years.

Weekly Average Hourly Load: March-June ⁵⁰



Change in MISO load reflected on right hand axis



Difference in average September 2020 load versus 4-yr average of same time

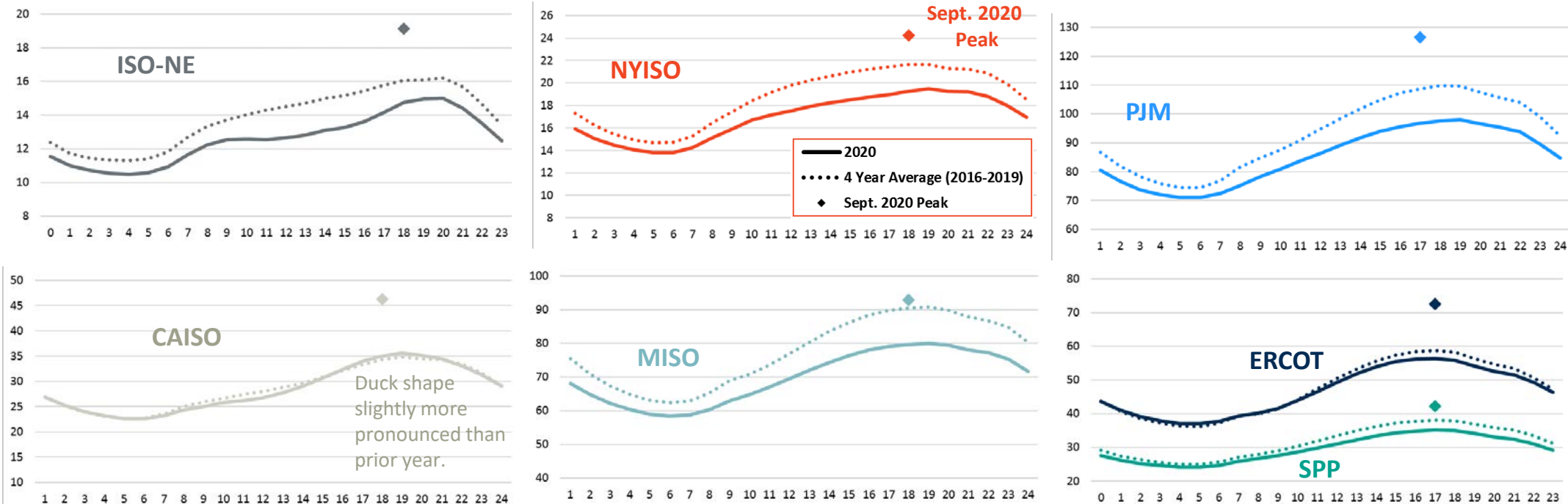
Note: Most demand reductions likely fall in peak hours, which accounts for approximately 50% of hours and the majority of energy consumption, so the impact on peak hours is likely greater than the all-hours estimated decreases above.

Impact on Regional Electric Load Shapes

The load shapes across ISOs are relatively unchanged, except for a tendency to lose load in afternoon hours, especially for MISO, ISO-NE, and NYISO.

- All of the ISOs have lower load levels in September 2020 versus September 2016-2019
- ISO monthly peaks are roughly in line with historical averages

Daily Average Load Shapes For Sept. 2020 vs. Sept. 2016-2019 (GWh)⁵⁰

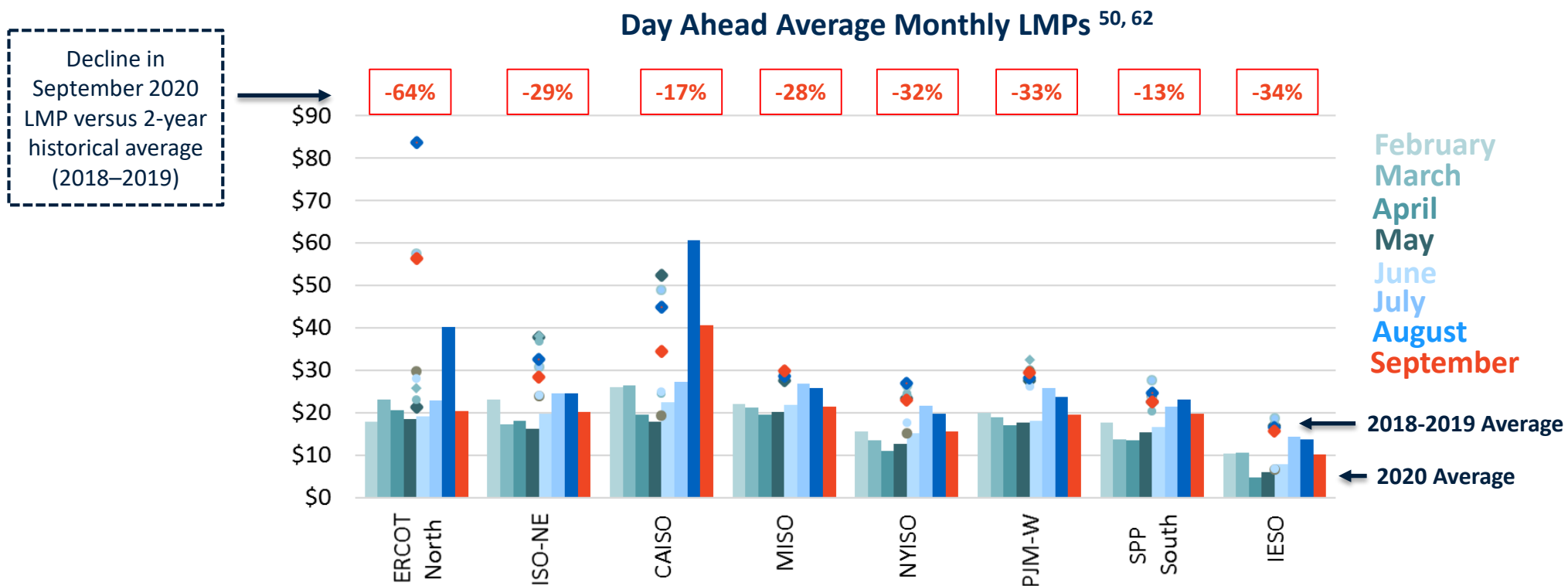


Note: PJM figure excludes single highest reported hour, which was determined to be unrealistically high by both Velocity Suite and Brattle.

Impact on Spot Electricity Pricing

Daily LMPs have been significantly below past 2-year averages in 2020, by 10–70% in almost every month since February in every ISO.

- Not necessarily due to COVID-19, but *this will strain viability for some coal and nuclear plants.*
- Traded forwards for 2021–2023 have been relatively unchanged throughout the pandemic.

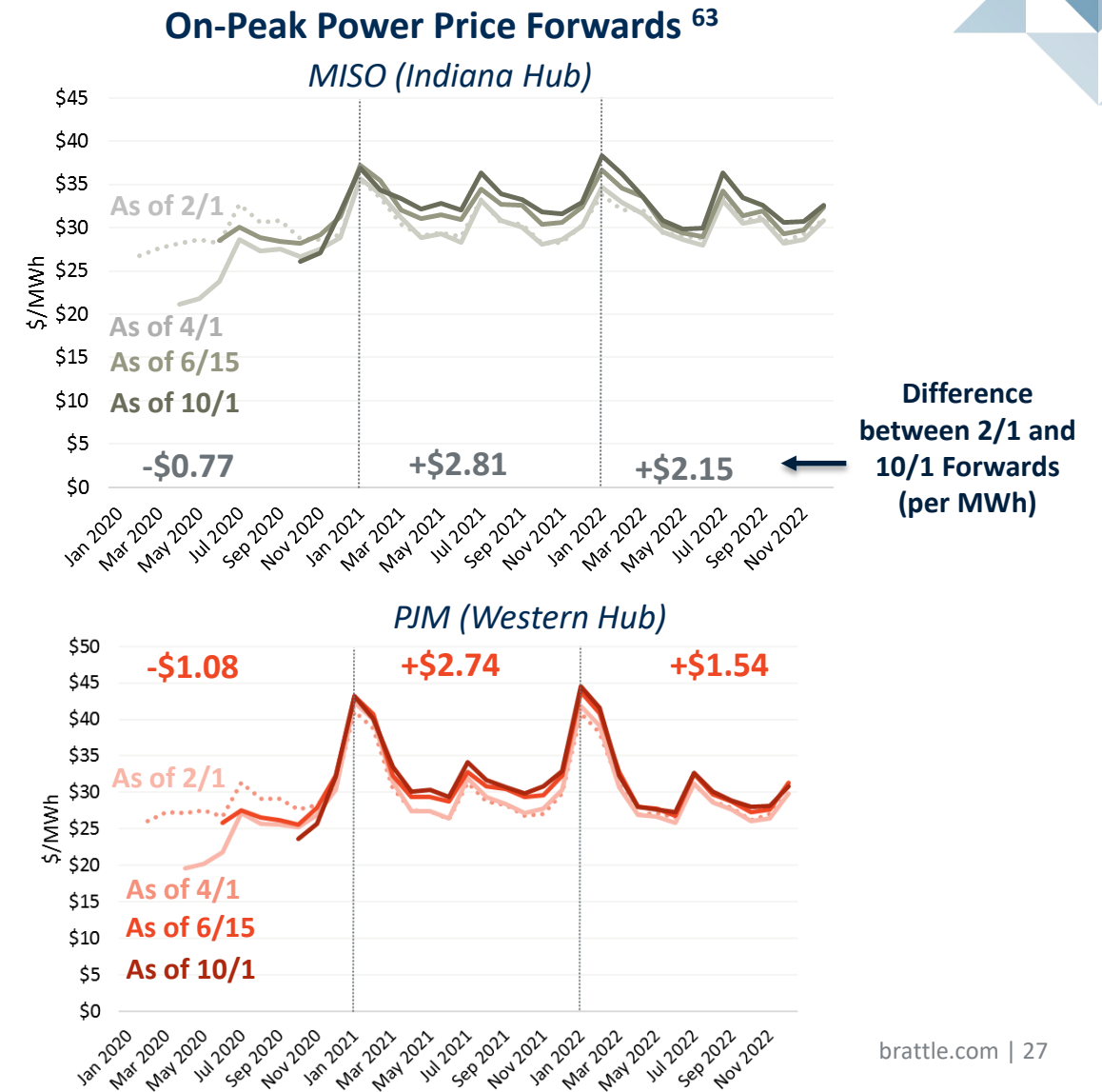
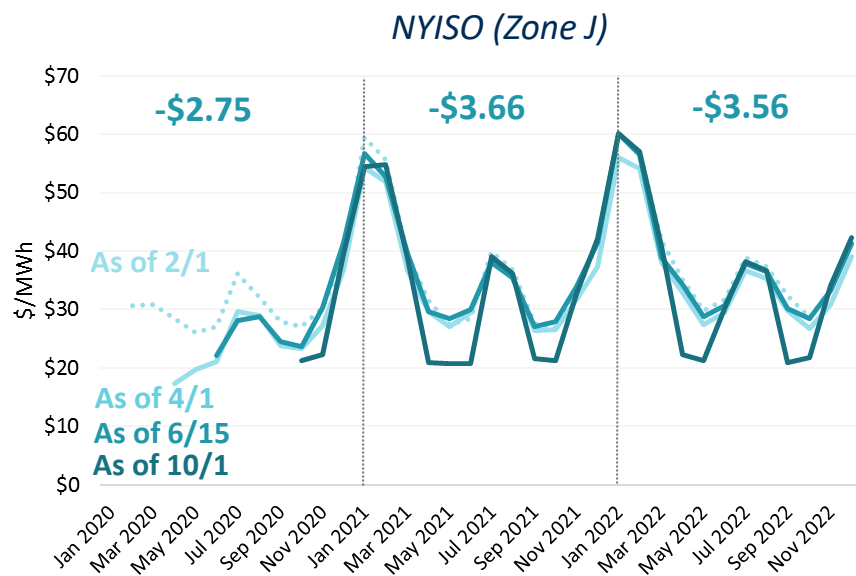


Note: IESO data reflects HOEP data, without the global adjustment. Converted from Canadian dollars using a conversion rate of 0.74, the annual average as of October 6, 2020.⁵⁵ ERCOT North data reflects settlement point prices.

Power Price Forwards in the Last 9 Months

At U.S. ISO hubs, average on-peak forward prices fell dramatically and universally by April for front months, but as of October 1 had increased to within ~\$1/MWh of where they were in February for PJM and MISO.

- Long-dated forwards for PJM West and MISO are slightly (\$1 to \$3/MWh) above pre-COVID-19 levels
- By contrast, NYISO power forwards have stayed \$3–\$4/MWh below February levels on average for most months.



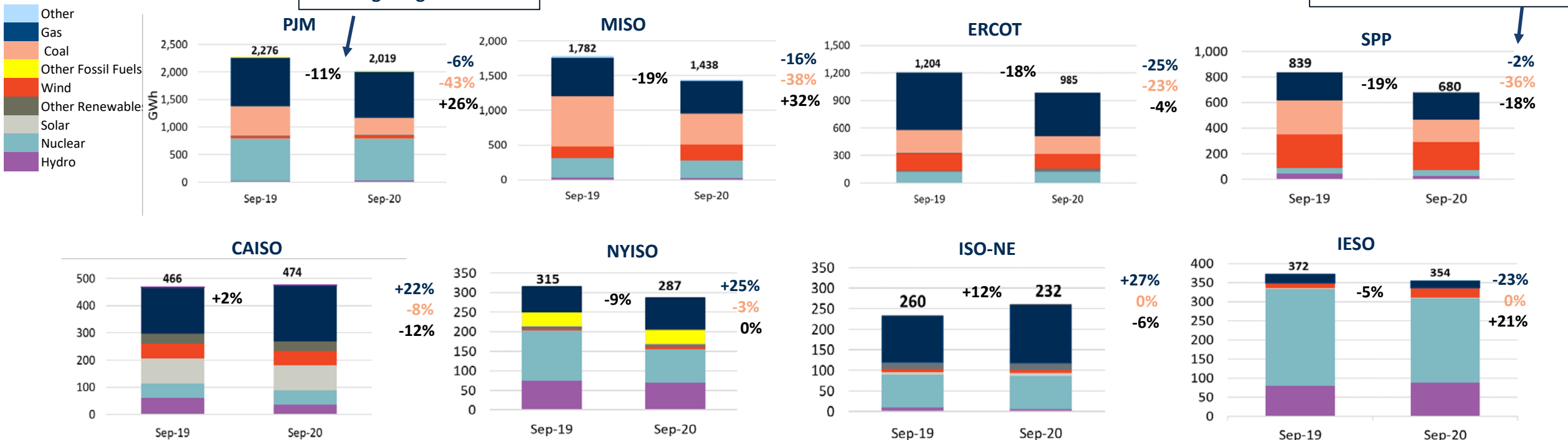
Generation Impacts

Electricity generation, including gas generation is down in September 2020 compared to September 2019 corresponding to a warmer September for all regions except CAISO and ISO-NE.

- Average US coal generation is down 19%.*

Generation by Fuel Type (GWh) 64,65,66,67,68,69,70,71

% Change in gas generation
% Change in coal generation
% Change in renewables



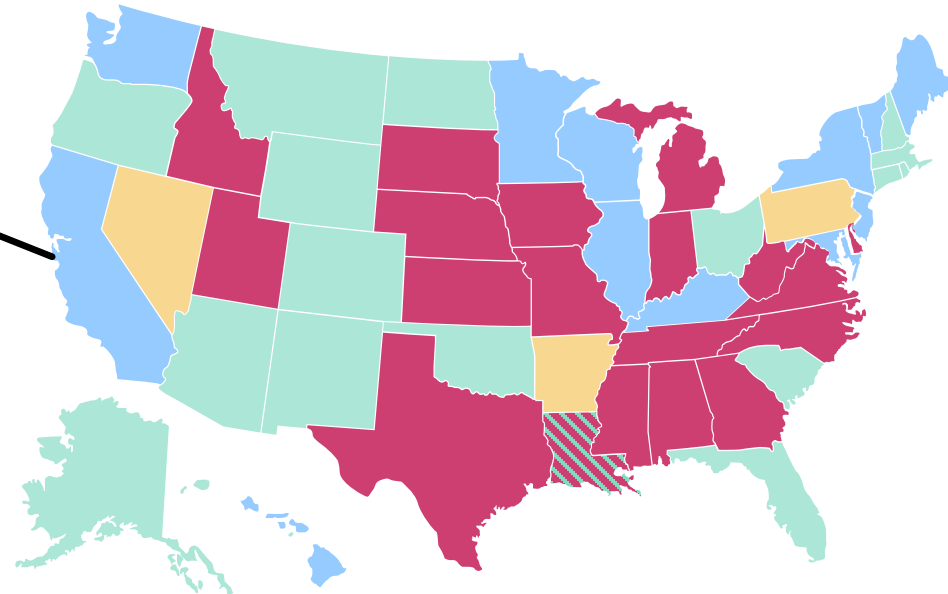
Note: 19% decline estimate includes PJM, MISO, SPP, CAISO, NYISO, ISO-NE, and IESO.

State Regulations Protecting Customers

All states had mandatory or voluntary suspensions of utility shutoffs as of late April, but since then 20 states' moratoriums have expired -- though many major IOUs continue to offer flexible payment options.

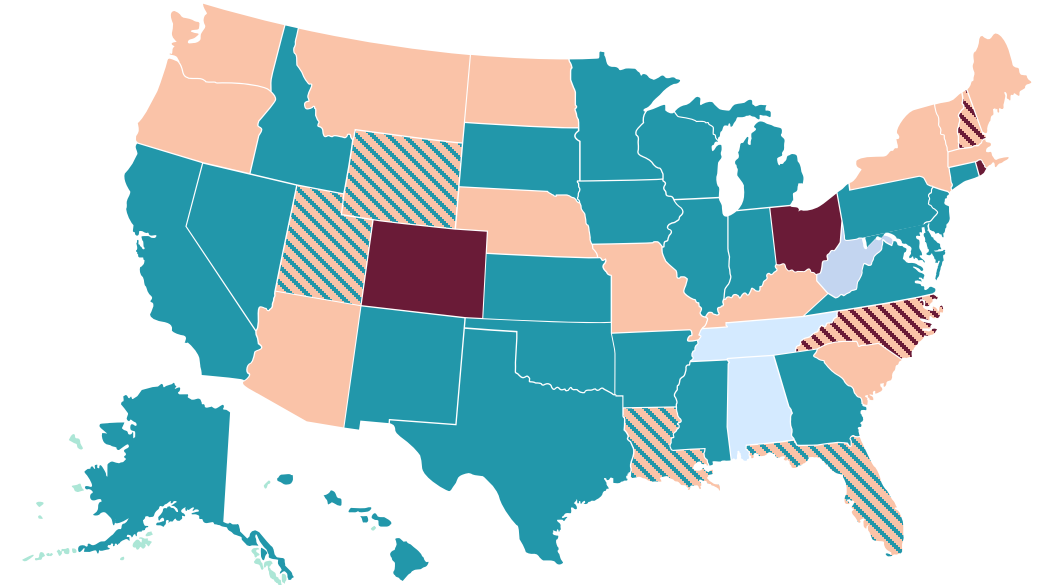
- Most moratoriums simply defer and accrue costs, with yet-to-be tested (or designed) cost recovery provisions.

Status of US COVID-19 utility service disconnection moratoriums ⁷²



Expired
Varies by company or customer class
In effect, target end date
In effect, indefinite end date

Status of US COVID-19 cost recovery mechanisms ⁷³



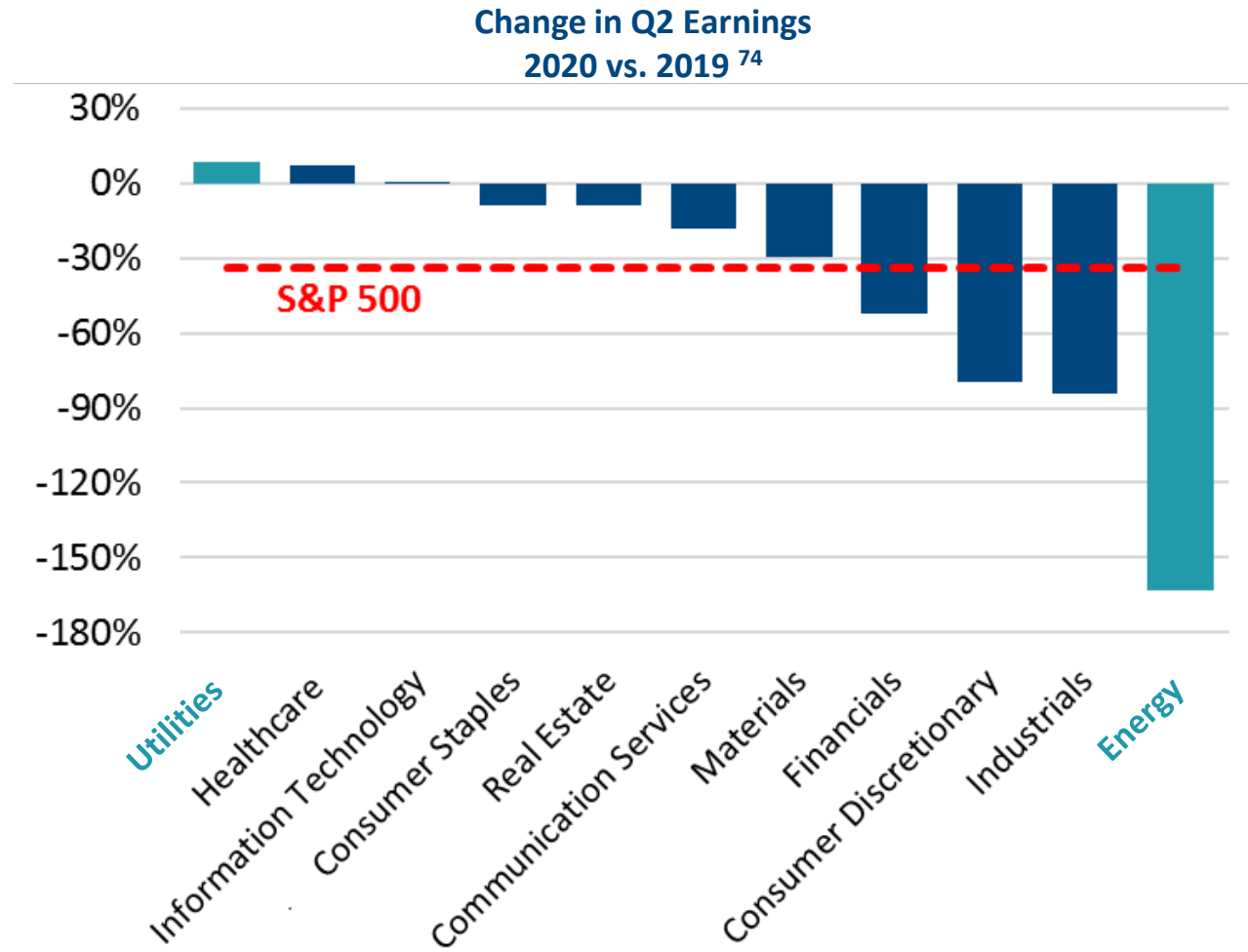
Deferral for future recovery
Pending
Customer Specific Plans
No Action Taken

Note: LA NOCC has expired moratoriums and LA-PSC varies by company or customer class.

Q2 2020 Utility vs. Other Industry Earnings

Notwithstanding load reduction and economic distress among customers, utility earnings *grew* by 8.9% in Q2 2020, while most industries declined 30% or more.

- The earnings growth, despite load and revenue reductions, appears due to cost reductions, which likely are not sustainable.
- As an essential service, utilities have been more insulated from general economic conditions than other sectors of the economy.
- Non-utility energy companies (oil & gas) were hit particularly hard, decreasing by more than 150%.



Note: Restaurants are included in the “consumer discretionary” category and airlines are in “industrials”.

Potential Financial Consequences

All else equal, a deferral of revenues will have an amplified effect on cash flow and earnings (due to substantial fixed costs)

- For a generic utility, a 10% revenue loss could mean a 26% loss in cash flow or a 43% loss in earnings*
- A 20% revenue loss would have a proportionately greater effect

For a utility with revenues of \$10 billion per year, this could mean an annual cash flow shortfall of \$0.6 to \$1.1 billion

- Unmitigated, these outcomes would be unsustainable while preserving any semblance of ongoing service quality

Illustrative Utility Financial Consequences due to COVID-19

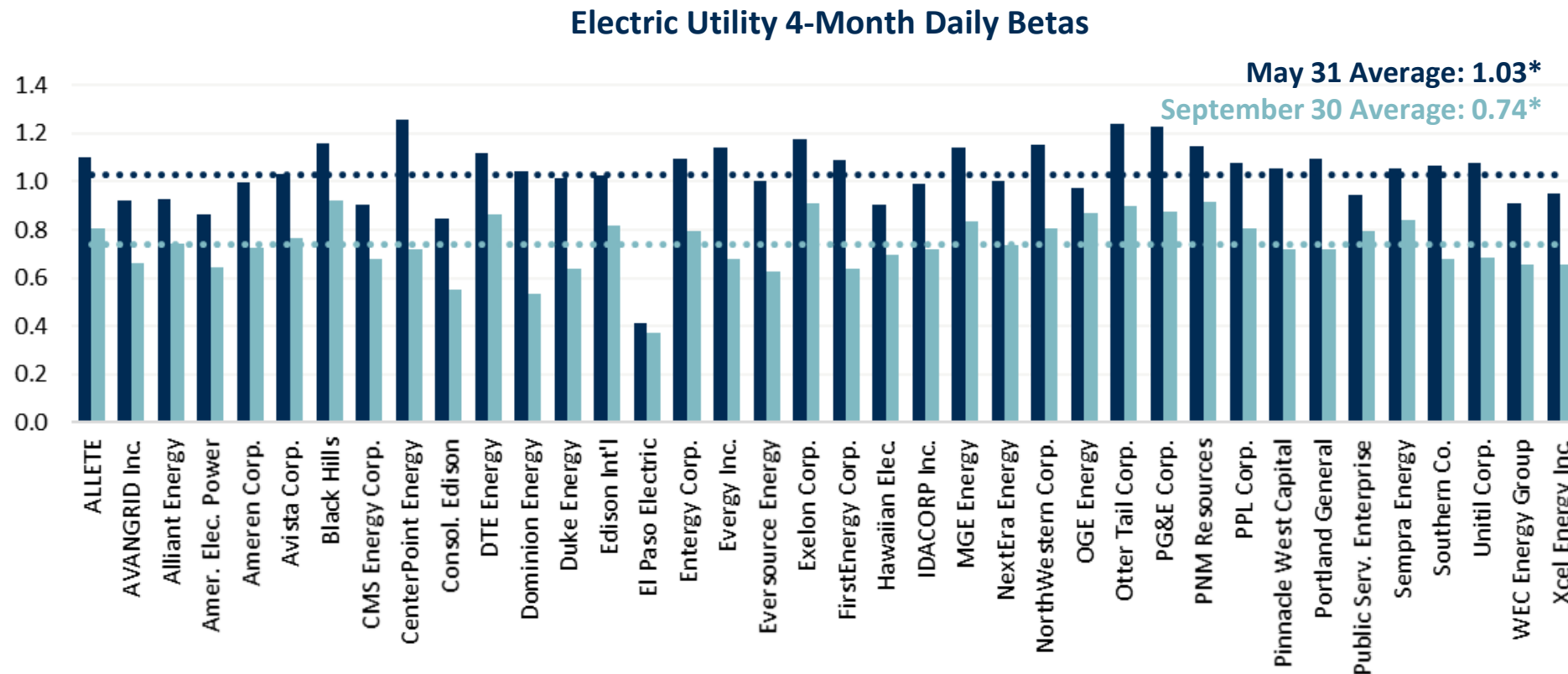
Revenue Loss		0%	-10%	-20%
Revenues	\$ Mil.	10,000	9,000	8,000
Expenses	\$ Mil.	6,667	6,447	6,227
EBITDA	\$ Mil.	3,333	2,553	1,773
Interest and Taxes	\$ Mil.	1,171	953	734
Funds from Operations (FFO)	\$ Mil.	2,162	1,601	1,039
Depreciation	\$ Mil.	845	845	845
Net Income	\$ Mil.	1,318	756	194
Realized ROE	%	10.0%	3.0%	0.8%
Debt	\$ Mil.	12,162	12,162	12,162
FFO/ Debt	%	17.8%	13.2%	8.5%
Change in FFO	%		-26%	-52%
Change in Net Income	%		-43%	-85%

If COVID-19 and depressed economic conditions persist or worsen, e.g. due to lack of public funds and defaults, an erosion of revenue and cost buffers could push utilities in this direction

* Assumes variable costs of 33%, and thus some cost savings with load reduction

Electric Utility Betas

Four-month daily betas, which increased across U.S. electric, gas, and water utilities from January 31 to 1.03 by May 31 (more than double their January 31 average) have since declined by about 30%.



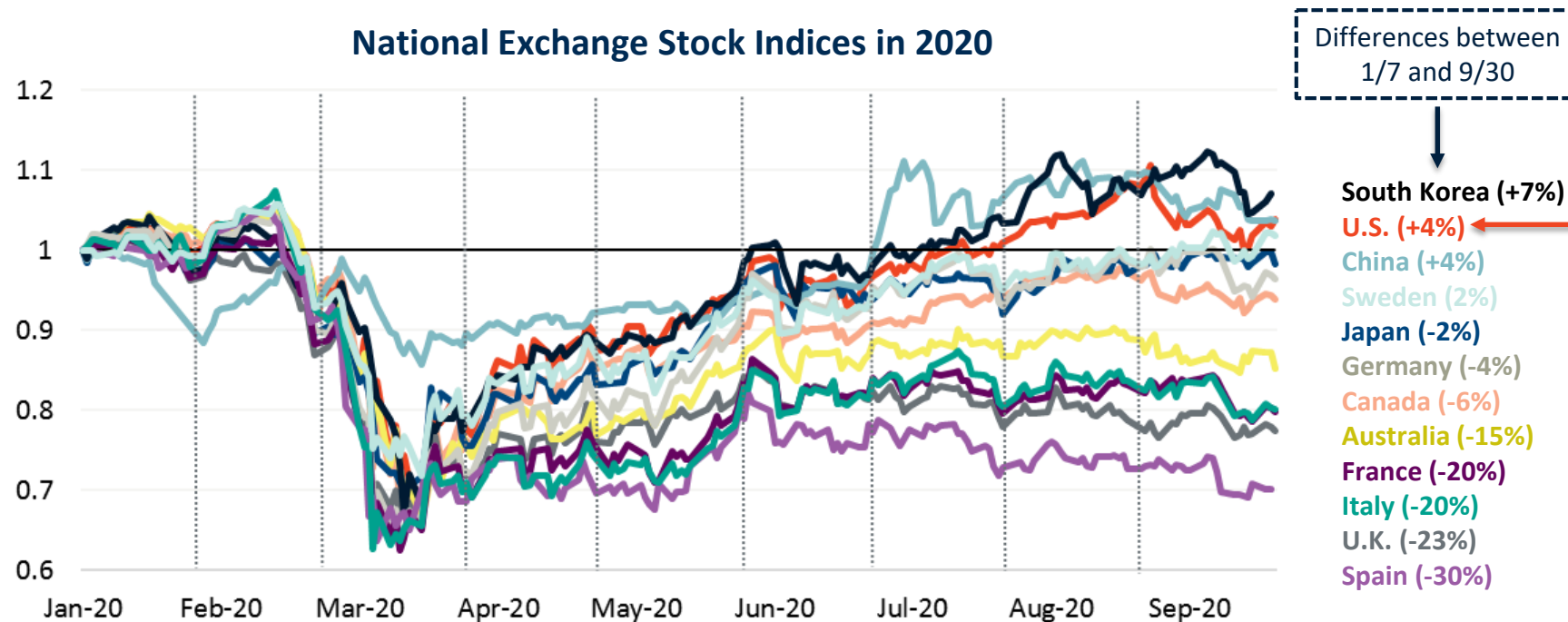
Source: Bloomberg, data as of September 30, 2020.

Note: *PG&E is not included in sample average due to bankruptcy restructuring.

Global Stock Prices

Most of the broad stock market indices of the countries shown below have experienced deep declines since the COVID-19 pandemic, roughly proportional to the severity of their COVID-19 outbreaks and the timeliness/depth of their lockdown.

- *E.g.*, Asian countries have relatively smaller losses compared to some in the E.U.
- The US has enjoyed less decline despite its severe COVID-19, probably due to its huge share of high-tech stocks that have become more critical during the pandemic, and its aggressive public financial interventions.

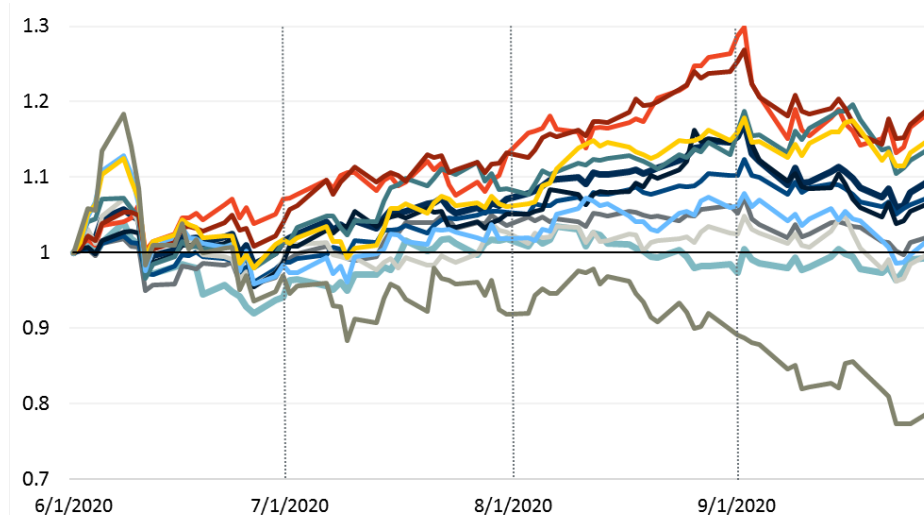
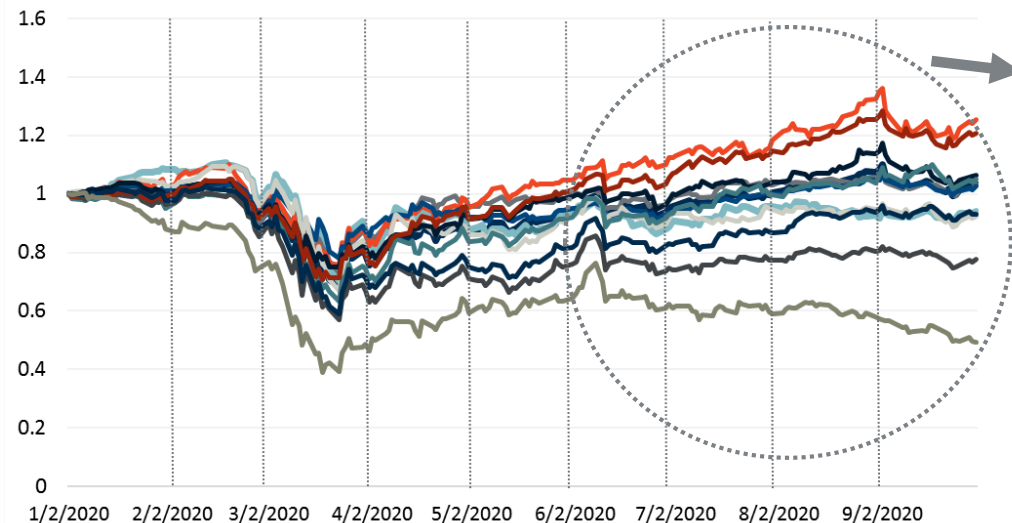


U.S. Sector Stock Prices

Utilities have lagged behind the overall U.S. market since the beginning of summer.

- In early months of COVID-19, utilities were moving in lock step with the S&P 500 as a whole (so high betas).
- Since early summer, all sectors of the market have behaved more independently, with utilities declining slightly by 0.1% versus S&P 500 growing at 10%, and other energy stocks (oil and gas E&P) down 23%.

2020 Daily Stock Price Indices



% Difference 9/30 vs. 6/1

IT (+20%)
Consumer Discretionary (+19%)
Materials (+14%)
Industrials (+14%)
S&P 500 (+10%)
Consumer Staples (+8%)
Communication Services (+7%)
Healthcare (+4%)
Financials (+2%)
Real Estate (+0.1%)
Utility (-0.1%)
Energy (-23%)

- From early September to beginning of October, only 3 utilities have been downgraded by S&P (Entergy New Orleans, Southwest Gas, El Paso Electric)*⁷⁵

Source: Bloomberg, data as of September 30, 2020.

Note: S&P Utility Index includes electric, gas, and water utilities.

*Assessing downgrades from September 10 – October 8, 2020.

Financial Impacts – Volatility

Stock market volatility spiked dramatically in early pandemic months but has steadily declined from its peak of 82.69 in mid-March and dropped back below the average seen in the Great Financial Crisis of 2008-09, beginning in the summer of 2020.

- Investors require higher equity returns during times of heightened uncertainty.



	Dot Com, 9/11 2000 - 2002	Hurricane Katrina 2003 - 2006	Financial Crisis 2008-2009	Post-Crisis 2009-2012	Modern Era 2013-2019	COVID-19 Mar-20	COVID-19 Apr-20	COVID-19 May-20	COVID-19 June - Aug 2020	COVID-19 Sep-20
VIX Index Average	25.4	14.9	35.1	22.7	14.9	57.7	41.5	30.9	27.0	27.6

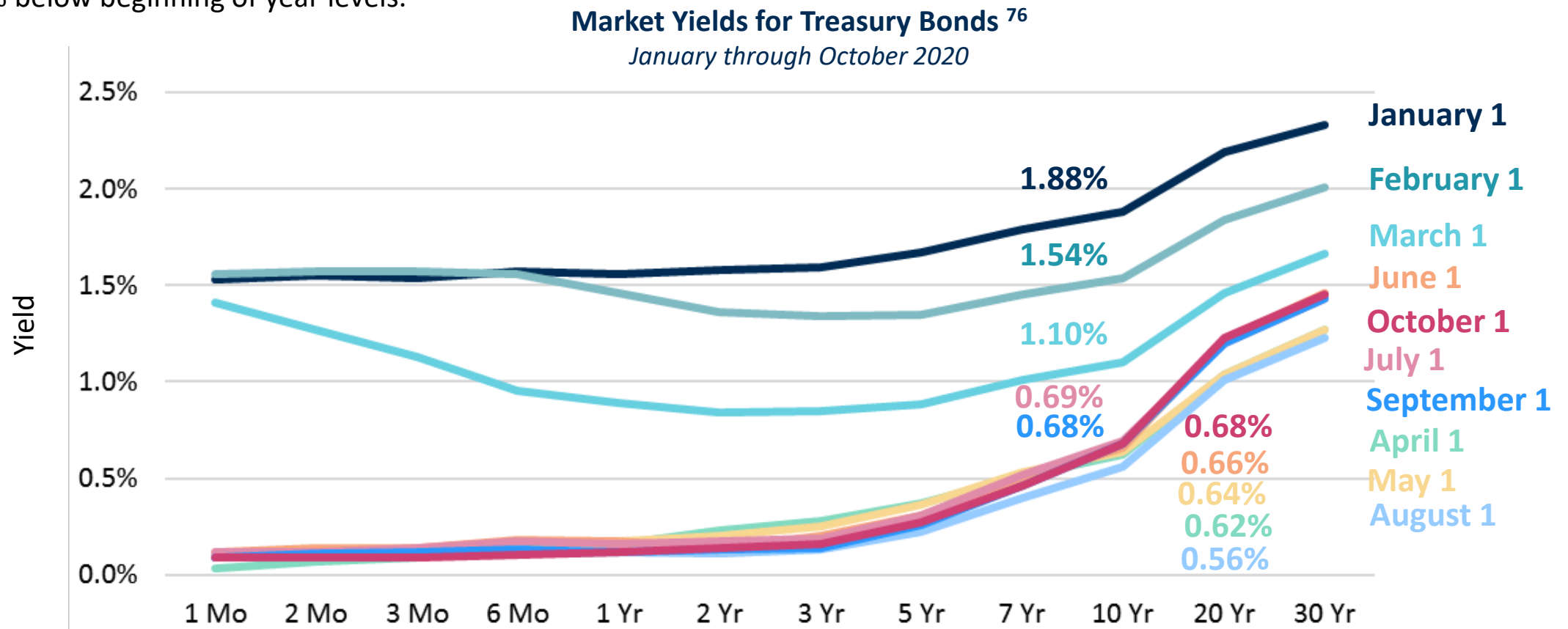
Source: Bloomberg, data as of June 30, 2020.

Note: For context, during the Great Recession, VIX reached a peak of 80.86 on November 20, 2008.

Treasury Yields

U.S. treasury yields are at historic lows, with most of the drop in the term structure happening in March and April -- since then only moving up a few basis points.

- 10-year yields have remained relatively constant since April, raising 4 basis points from April to September, but remains over 60% below beginning of year levels.



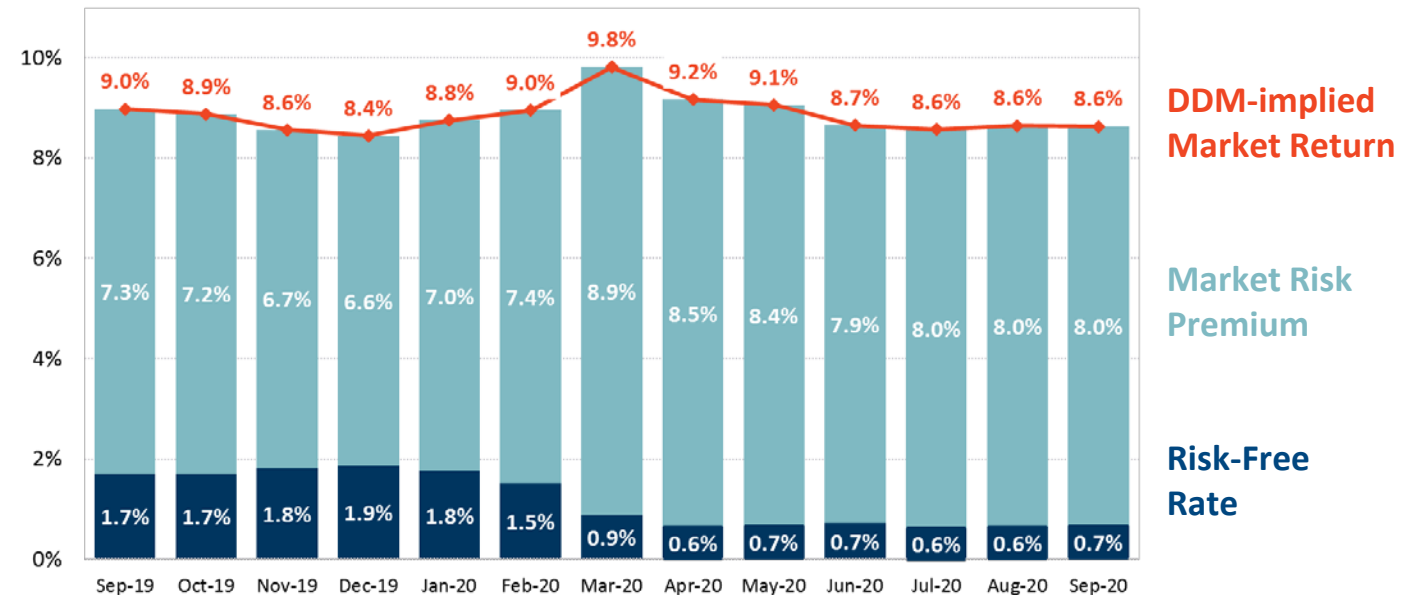
U.S. Required Returns

The current implied return expected for the market as a whole is about at 2019 levels.

But the composition is different than in the past, with a higher MRP and a lower risk-free rate.

- Implied returns rose steadily from the beginning of 2020 through March, but declined in April and May.
- Ten-year government bond rates are about 140 bps lower than the 2019 average, while the 8.1% MRP is about 100 bps higher, which results in a market return that is comparable to the 2019 average of 9.2%.

Expected U.S. Market Returns (S&P 500)



Source: Bloomberg, data as of September 30, 2020.

Notes: Market return estimated by Bloomberg with a forward-looking Dividend Discount Model.

Risk-free rate is based on 10-year U.S. Treasury yield. Return based at approximately 70% equity capital structure.

Potential Future Economic Risk



Economic Risk for Individuals

It is estimated that the number of people in poverty has grown by approximately 8 million since May.⁷⁷

- But surprisingly, personal bankruptcies through the COVID-19 period are 35% *below* average – possibly due to replacement income from the CARES Act (which has recently expired) and bill moratoria.

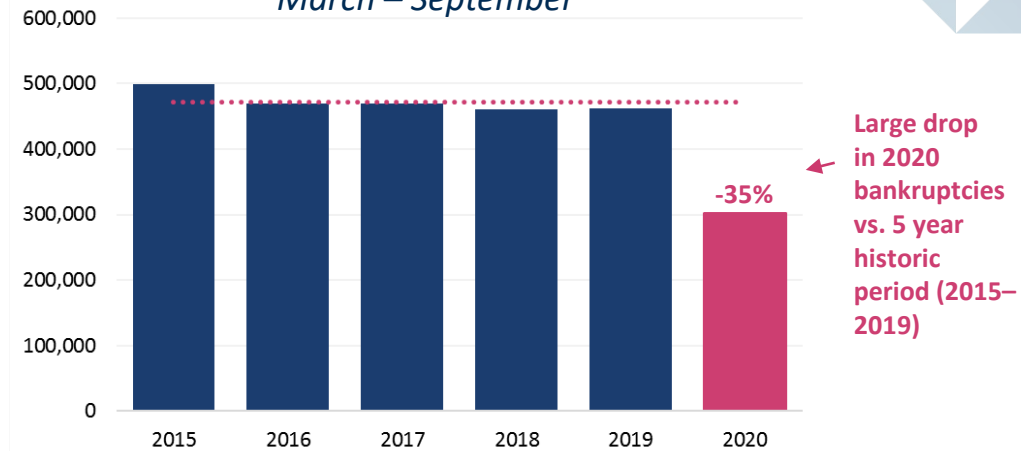
Mounting household debt and bank decisions to reserve billions to cover expected losses suggest a wave of bankruptcies is yet to come.^{79,80}

In September, over 6 million households (over 8% of renters and 7% of homeowners) did not make their rent or mortgage payments, and 26 million individuals (40% of student debt borrowers) missed their student loan payments.⁸¹

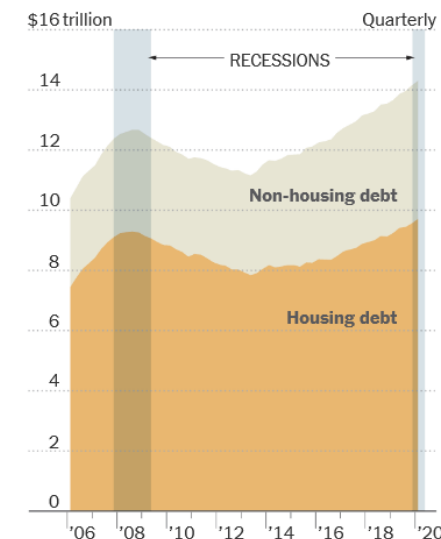
An estimated 30–40 million people are at risk of rental housing evictions because of the COVID-19 pandemic.⁷⁸

In September, the CDC issued a temporary national moratorium on most evictions through the end of 2020, providing temporary assistance to renters (though tenants are still responsible for back rent, fees, and penalties).⁷⁸

Personal Bankruptcies⁸³
March – September



Total Household Debt⁸²



Economic Risk for Companies

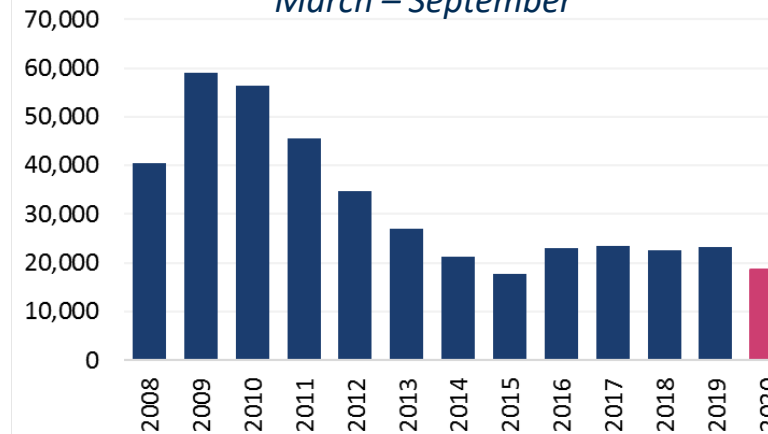
The impact of the COVID-19 crisis on commercial bankruptcies has also been lagging, but the pattern of rising bankruptcies in the years following the 2008-2009 Great Recession suggests that a spike in commercial bankruptcies may be yet to come.⁸⁴

- In the first half of 2020, the Administrative Office of the U.S. Courts acknowledged, “Bankruptcy filings tend to escalate gradually after an economic downturn starts. Following the Great Recession, new filings escalated over a two-year period until they peaked in 2010.”⁸⁵
- Ch. 11 bankruptcies (one category of commercial bankruptcy filings), have already begun to rise in 2020.⁸⁴

The average economic decline masks that certain sectors are being hit much harder than others, as highlighted by the high share of bankruptcies in consumer discretionary, industrials, and energy.⁸⁶

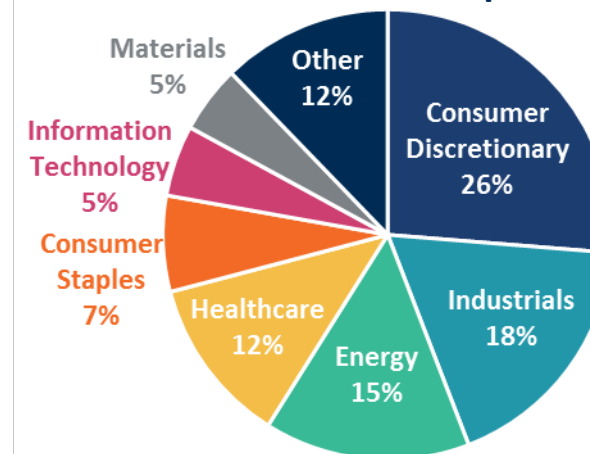
Commercial Bankruptcies^{84, 87}

March – September



Source: American Bankruptcy Institute.

2020 Commercial Bankruptcies by Sector⁸⁶



Source: S&P. Includes companies with assets or liabilities greater than \$2 million (if have issued public debt) or \$10 million (if not). Excludes 117 companies which could not be assigned to a primary sector by S&P. Other category includes 5% or less of the following: communicant services, real estate, financials, utilities.

Stimulus Packages

In March 2020, the passage of the \$2 trillion CARES Act provided economic assistance for business and individuals.⁸⁸

- Economic Impact Payments provided up to \$1,200 per adult and \$500 per child – up to \$3,400 for a family of four.
- Pandemic Unemployment Compensation expanded payments to \$600 per week through July 31, 2020.

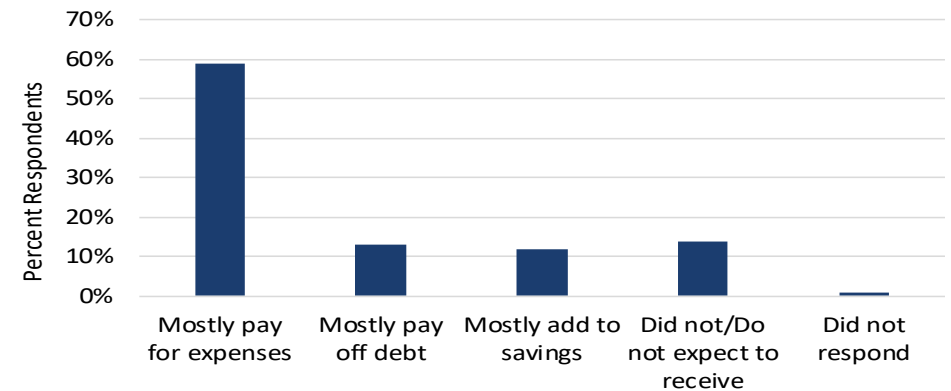
Many people saw delays in receiving benefits due to overwhelmed Unemployment Offices and tying distribution of Economic Impact Payments to prior tax filings.

- Research shows that the delays disproportionately impacted economically vulnerable households – low income households, part-time workers, the unbanked, and racial/ethnic minorities.⁸⁹

According to a Bureau of Labor Statistics (BLS) survey, the majority of recipients (59%) spent stimulus \$ on paying expenses, such as food and utilities, and to a lesser extent paying down debt or adding to savings (~10%).⁹⁰

Congress is currently debating next stimulus package. Current proposals range from \$0.5 to \$1.8 trillion package, which may include an additional round of stimulus checks and funding for state & local aid and unemployment benefits.⁹¹

BLS: Primary Use of Stimulus Payments⁹⁰



BLS Survey: Stimulus Spending by Category⁹⁰

Expenditure Category	Percent
Food	66%
Utilities and telecommunications	50%
HH supp and personal care	47%
Rent	28%
Paying down debt	25%
Vehicle payments	23%
Mortgage	23%
Clothing	17%
Savings or investment	16%
Other	7%
Household items	7%
Donating or giving to family/friends	6%
Recreational Goods	3%

Note: Percentages do not add to 100%; respondents allowed to select multiple categories when responding

COVID-19 Winter Outlook

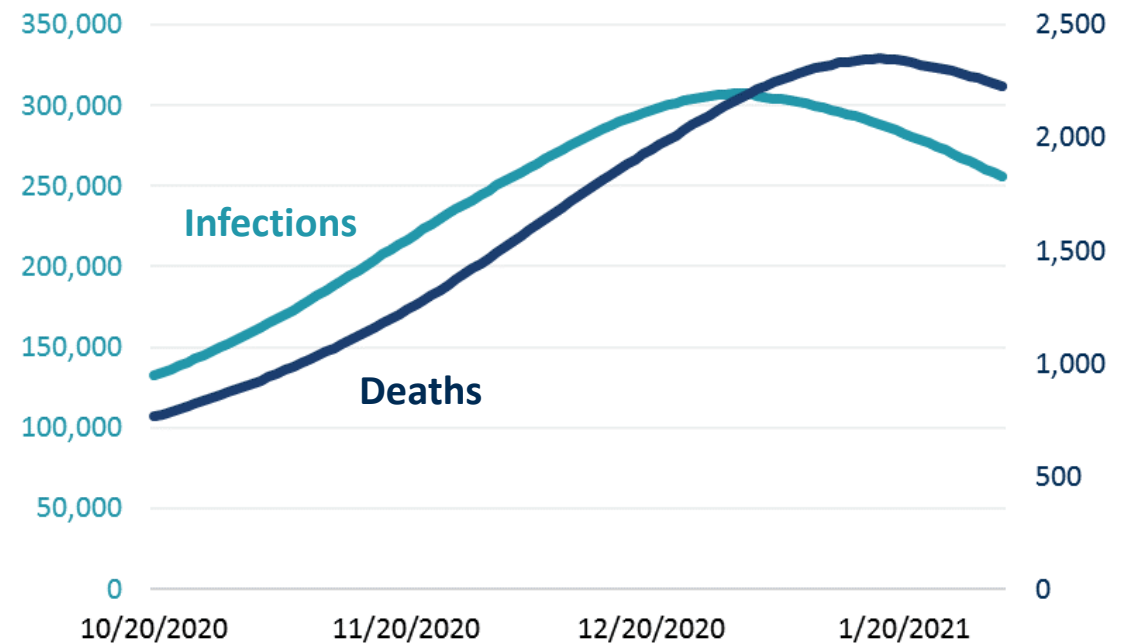
There are indicators and projections that COVID-19 infections will grow dramatically this coming winter, consistent with typical seasonal flu trends. This could trigger renewed economic shutdowns and commercial stresses.

- There were 40x as many flu cases in fall and winter 2019 compared to prior summer and spring.^{92,93}
- The 1918 influenza outbreak experienced 5x the amount of deaths in fall and winter as in the summer months.

The seasonality of COVID-19 outbreaks is yet to be observed, but experts believe it will play a factor due to closer proximity and reduced ventilation in colder weather, and social activities at colleges and schools.⁹⁴

IHME's October 9th forecast estimates an increase in both daily infection and deaths through the end of the year, with daily *infections peaking at over 300,000 at the end of 2020 and daily deaths growing until they peak at over 2,300 in mid-January 2021.*

IHME U.S. COVID-19 Daily Projections⁹⁵



Source: IHME, forecast as of October 9, 2020.

Financial Winter Outlook

Some stock market analysts wonder if the stock market is overvalued, with the growth in stock prices underweighting the risk of a GDP downturn over the next few months.^{96,97} Some risk indicators include:

- The abnormally high level of the Shiller PE Ratio (prices divided by 10-yr average past earnings adjusted for inflation). When this has reached around 25X in the past, it has often lead to large “corrections”.
- The “Buffett Index” (ratio of the value of the stock market capitalization to the nominal US GDP) is about 1.7X (using Willshire 5000 as numerator). When this is above 1.0, it has been a harbinger of poor returns on equities.⁹⁸

On the regulatory front, allowed equity returns for electric and gas utilities have decreased by 15 basis points on average through the third quarter of 2020, according to a recent S&P study.⁹⁹

Shiller PE Ratio¹⁰⁰



Source: Shiller PE Ratio, <https://www.multpl.com/shiller-pe>.

The uncertainty of the current market, combined with customer accounts in arrears and potential third wave of COVID-19, illustrate the precarious financial situation facing utilities and their commercial and individual customers over the next few months.

Key Takeaways



A Precarious Situation for Personal Finances?

U.S. continues to have both the highest number of cumulative confirmed cases and deaths in the world as COVID-19 resurges and spreads across the country.

- Previously less affected areas like Midwestern states are emerging as COVID-19 hotspots.

Although GDP forecasts project significant growth in Q3 2020 followed by sustainable growth through 2021, the effect of COVID on personal and small commercial finances may be just beginning to emerge.

- There is typically a lag in bankruptcies (both commercial and personal) after a recession, and indeed 2020 bankruptcies are below historic levels.
- As CARES funds dissipate and bill moratoria end, the likelihood of credit, rent and utility non-payments increases – possibly occurring in such scale that they would magnify each other.

Oil & Gas

Recovery in the crude oil markets has lost momentum since the partial rebound at the beginning of the summer, as prices remain near \$40/bbl waiting on further economic recovery and demand growth.

- Demand for transportation fuels, which account for 68% of US demand, remains under pressure as measures of personal mobility remain below pre-COVID-19 levels. For example, passenger airline travel remains down about 68% compared to last year.
- Pace of economic recovery could lead to further recovery of oil prices. However, rising COVID-19 infections around the world and resumption of lockdowns could put further downward pressure on demand. Futures markets currently indicate that oil prices will not reach \$50/bbl until 2024 (Brent) and 2028 (WTI).

Natural gas futures have risen despite very high storage inventory levels, likely reflecting lower production capacity after shutdowns from associated gas, increased LNG demand to serve the EU, and near-normal domestic demand.

- Natural gas spot prices have stayed low, between \$1 - \$2/Dth at most hubs, but forwards are up to as much as \$3.25/Dth for this coming Winter, a 28% (\$0.72/Dth) increase since February and a 13% (\$0.37/Dth) increase since July.
- Average price through the end of Winter 2021/2022 is near \$3.00/Dth.

Electricity Load Decline in September

Electricity load was fairly comparable throughout this past summer to its average in the previous four year period. However, it declined significantly by 7% in the latter part of September.

- The majority of ISO load decline in September occurred in MISO and PJM.

Daily LMPs have been well below past 2-year averages by 10–70% in almost every month since February in every ISO.

- Not necessarily due to COVID-19, but this will strain viability for some coal and nuclear plants.
- Traded forwards are relatively unchanged for 2021–2023 throughout the pandemic.

Utility Risk Remains Elevated

Since late April, 20 states' utility shutoff moratoria have expired, potentially leaving millions of residents at risk.

- However, many IOUs continue to offer flexible payments options and several states are evaluating new moratoria.

Despite widespread load and revenue reductions, Q2 earnings for electric utilities were up on average over the prior year – largely due to defensive cost reductions not likely to be sustainable over time.

Utility stock index lags behind the S&P 500, remaining fairly constant throughout the summer, while the S&P 500 has grown 10%.

Electric utility betas have fallen back by around 30% from a sharp increase at the beginning of the summer.

We may have come through a more halcyon time of pandemic consequences than the coming winter: COVID-19 infection and death rates are projected to rise very sharply, which, combined with reduced unemployment benefits and expiring bill moratoria, suggest that personal financial hardships will increase and may spill over to increases in utility non-payments and depressed energy demand.

Sources



Sources

1. "Coronavirus Locations: COVID-19 Map by County and State", USAFACTS, October 17, 2020. Accessed October 18, 2020, <https://usafacts.org/visualizations/coronavirus-covid-19-spread-map>.
2. Anurag Maan and Lisa Shumaker, "U.S. coronavirus cases rise month-over-month in 27 states in September, led by Wisconsin," *Reuters*, October 1, 2020. Accessed October 5, 2020, <https://www.reuters.com/article/us-health-coronavirus-usa-september/u-s-coronavirus-cases-rise-month-over-month-in-27-states-in-september-led-by-wisconsin-idINKBN26M5OC>.
3. Lisa Shumaker. "As cold weather arrives, U.S. states see record increases in COVID-19 cases," *Reuters*, October 4, 2020. Accessed October 5, 2020, <https://www.reuters.com/article/us-health-coronavirus-usa/as-cold-weather-arrives-u-s-states-see-record-increases-in-covid-19-cases-idUSKBN26P0K8>.
4. Madeline Holcombe and Christina Maxouris, "Only 3 states are reporting declines in new coronavirus cases as the US hits its highest daily rate in 2 months," *CNN*, October 4, 2020. Accessed October 5, 2020, <https://www.cnn.com/2020/10/04/health/us-coronavirus-sunday/index.html>.
5. Nadia Zonis and Peter Walker, "Worrisome Data as the Weather Turns <https://fortune.com/2020/04/23/us-unemployment-rate-numbers-claims-this-week-total-job-losses-april-23-2020-benefits-claims/> : This Week in COVID-19 Data, Oct 8," *The COVID Tracking Project*, October 8, 2020. Accessed October 18, 2020, <https://covidtracking.com/blog/weekly-update-oct-8>.
6. "Rt COVID-19," accessed October 18, 2020, <https://rt.live/>.
7. "Resurgent Virus Rages Across the American Heartland," The New York Times coronavirus briefing, October 23, 2020. Accessed October 26, 2020, <https://www.nytimes.com/live/2020/10/23/world/covid-19-coronavirus-updates>.
8. "Coronavirus Locations: COVID-19 Map by County and State", USAFACTS, October 17, 2020. Accessed October 18, 2020, <https://usafacts.org/visualizations/coronavirus-covid-19-spread-map>
9. Bill Chapell, "'Enormous And Tragic': U.S. Has Lost More Than 200,000 People To COVID-19," *NPR*, September 22, 2020 . Accessed October 5, 2020, <https://www.npr.org/sections/coronavirus-live-updates/2020/09/22/911934489/enormous-and-tragic-u-s-has-lost-more-than-200-000-people-to-covid-19>.
10. Nick Routley, "Infection Trajectory: See Which Countries are Flattening Their COVID-19 Curve," *The Visual Capitalist*, March 16, 2020. Accessed October 18, 2020, <https://www.visualcapitalist.com/infection-trajectory-flattening-the-covid19-curve/>.

Sources

11. Goldman Sachs, “The Way Forward”, September 27, 2020, accessed October 5, 2020.
12. Goldman Sachs, “The Way Forward”, June 21, 2020, accessed July 1, 2020.
13. Congressional Budget Office, “An Update to the Economic Outlook: 2020 to 2030”, July 2020, <https://www.cbo.gov/system/files/2020-07/56442-CBO-update-economic-outlook.pdf>.
14. Federal Open Market Committee, “September 16, 2020: FOMC Projections materials,” September 16, 2020, accessed October 5, 2020, <https://www.federalreserve.gov/monetarypolicy/fomcprojtabl20200916.htm>.
15. Mary Williams Walsh, “Federal Aid Has So Far Averted Personal Bankruptcies, but Trouble Looms,” *The New York Times*, July 17, 2020, <https://www.nytimes.com/2020/07/17/business/personal-bankruptcies-coronavirus.html>.
16. Jobless claims graphic: “Unemployment Insurance Weekly Claims Data”, United States Department of Labor, Data accessed October 2, 2020, <https://oui.doleta.gov/unemploy/claims.asp>.
17. Bureau of Labor Statistics, “The Employment Situation – June 2020”, July 2, 2020, accessed July 5, 2020, <https://www.bls.gov/news.release/pdf/empisit.pdf>.
18. Department of Labor News Release, “Unemployment Insurance Weekly Claims,” published weekly. See for example, news release dated September 17, 2020, accessed October 2, 2020, <https://www.dol.gov/sites/dolgov/files/OPA/newsreleases/ui-claims/20201770.pdf>.
19. EIA, “Oil and petroleum products explained, use of oil” September 3, 2020, accessed October 5, 2020, <https://www.eia.gov/energyexplained/oil-and-petroleum-products/use-of-oil.php>.
20. BP, “Energy Outlook, Oil,” September 14, 2020, accessed October 5, 2020, <https://www.bp.com/en/global/corporate/energy-economics/energy-outlook/demand-by-fuel/oil.html>.
21. EIA, “Use of energy explained, Energy for transportation,” June 2, 2020, accessed October 5, 2020, <https://www.eia.gov/energyexplained/use-of-energy/transportation.php>.
22. EIA, Weekly Petroleum Status Report, September 30, 2020, accessed October 1, 2020, <https://www.eia.gov/petroleum/supply/weekly/>.

Sources

23. Joe Wallace, “Oil Market Flies Blind as COVID-19 Clouds Demand Outlook,” The Wall Street Journal, September 22, 2020, accessed October 4, 2020 <https://www.wsj.com/articles/oil-market-flies-blind-as-covid-19-clouds-demand-outlook-11600767600>.
24. EIA, Short-Term Energy Outlook, October 6, 2020 <https://www.eia.gov/outlooks/steo/>
25. S&P Global Market Intelligence, Oil & Refined Products Summary, February 1, 2020 through September 30, 2020. October 1, 2020, <https://platform.marketintelligence.spglobal.com/web/client?auth=inherit#markets/OilSummary>.
26. Baker Hughes, “North America Rotary Rig Count (Jan 2000 – Current),” accessed October 1, 2020, <https://rigcount.bakerhughes.com/na-rig-count>
27. EIA, Petroleum & Other Liquids, Weekly Supply Estimates https://www.eia.gov/dnav/pet/pet_sum_sndw_a_EPJK_vpp_mbbldpd_w.htm
28. TSA, TSA Checkpoint travel numbers for 2020 and 2019, <https://www.tsa.gov/coronavirus/passenger-throughput>.
29. Joanna Muller, “Airlines begin mass layoffs while clinging to hope for federal aid,” *Axios*, October 1, 2020, <https://www.axios.com/airlines-layoffs-federal-aid-7f309a29-46c6-440b-9edb-01b1783ea6a2.html>.
30. International Air Transport Association, “Traffic Forecast Downgrade After Dismal Summer,” September 29, 2020, accessed October 4, 2020, <https://www.iata.org/en/pressroom/pr/2020-09-29-02/>.
31. France 24, “Paris put on top COVID-19 alert level as virus resurges,” October 4, 2020, accessed October 4, 2020, <https://www.france24.com/en/20201004-paris-braces-for-top-covid-19-alert-level-as-virus-resurges>.
32. Damian Grammaticas, “Coronavirus: Spain imposes partial lockdown on defiant Madrid,” October 3, 2020, accessed October 4, 2020, <https://www.bbc.com/news/world-europe-54383548>.
33. Reuters, “UK eyes tougher COVID-19 restrictions for England as outbreak spreads,” September 28, 2020, accessed October 4, 2020, <https://www.reuters.com/article/us-health-coronavirus-britain/uk-eyes-tougher-covid-19-restrictions-for-england-as-outbreak-spreads-idUSKBN26J0QU>.

Sources

34. Vladimir Soldatkin, Rania El Gamal, Ahmad Ghaddar, “Exclusive: OPEC+ need to offset large May-July oversupply-document,” August 20, 2020, accessed October 4, 2020, <https://www.reuters.com/article/us-oil-opec-exclusive/exclusive-opec-needs-to-offset-large-may-july-oversupply-document-idUSKBN25G1GJ>.
35. S&P Global Market Intelligence, Futures, February 1, 2020, May 1, 2020 and September 30, 2020. Accessed October 1, 2020, <https://platform.marketintelligence.spglobal.com/web/client?auth=inherit#markets/commoditiesChart>.
36. EIA, Natural Gas Weekly Update, October 1, 2020, accessed October 2, 2020, <https://www.eia.gov/naturalgas/weekly/>
37. EIA, Weekly Natural Gas Storage Report, accessed October 2, 2020, <http://ir.eia.gov/ngs/ngs.html>
38. Andreas Franke, “EDF delays French Bugey reactor returns to end-Nov, Q4 prices rise,” S&P Global Platts, August 28, 2020, <https://www.spglobal.com/platts/en/market-insights/latest-news/natural-gas/082820-edf-delays-french-bugey-reactor-returns-to-end-nov-q4-prices-rise>.
39. Gas Infrastructure Europe, accessed October 2, 2020, <https://agsi.gie.eu/#/graphs/eu>.
40. Joe Wallace, “US Gas Exporters Eye Europe’s Surging Prices,” The Wall Street Journal, September 16, 2020, accessed October 5, 2020, <https://www.wsj.com/articles/u-s-gas-exporters-eye-europes-surging-prices-11600251662>.
41. Corey Paul, “Rebound in US LNG exports continues with fewer cancellations for November,” S&P Global Market Intelligence, September 22, 2020 <https://platform.marketintelligence.spglobal.com/web/client?auth=inherit#news/article?KeyProductLinkType=2&id=60443043>.
42. FERC, “North American LNG Export Terminals Existing” May 29, 2020 <https://www.ferc.gov/sites/default/files/2020-06/lng-existing-export-052920.pdf>.
43. Reuters Staff, “LNG vessels wait in Gulf of Mexico for Hurricane Delta to pass,” October 7, 2020, accessed October 22, 2020, <https://www.reuters.com/article/usa-lng-vessels-storm-idUSL1N2GY0QE>.
44. ICIS Heren LNG Edge database. Accessed October 7, 2020.

Sources

45. Reuters, “U.S. natgas futures rise over 4% on higher LNG exports,” October 5, 2020, accessed October 6, <https://uk.reuters.com/article/usa-natgas/u-s-natgas-futures-rise-over-4-on-higher-lng-exports-idUKL1N2GW0A8>
46. S&P Global Market Intelligence, Natural Gas Forwards & Futures, Accessed July 2, 2020, <https://platform.marketintelligence.spglobal.com/web/client?auth=inherit#markets/commoditiesChart>.
47. S&P Global Market Intelligence, Day-Ahead Natural Gas Prices - Daily, February 1, 2020 through September 30, 2020. Accessed, October 1, 2020, <https://platform.marketintelligence.spglobal.com/web/client?auth=inherit#markets/commoditiesChart>.
48. Reuters, “U.S. natgas futures rise close to 9-month high as Hurricane cuts output,” August 27, 2020, accessed October 5, 2020, <https://www.reuters.com/article/usa-natgas/u-s-natgas-futures-rise-close-to-9-month-high-as-hurricane-laura-cuts-output-idUKL1N2FT0PD>.
49. National Oceanic and Atmospheric Administration, National Weather Service Climate Prediction Center, “U.S. Daily Temperature Analyses,” Accessed October 2, 2020, https://www.cpc.ncep.noaa.gov/products/tanal/temp_analyses.php.
50. Velocity Suite, ABB Inc. Accessed October 2, 2020.
51. S&P Global Market Intelligence, Monthly Generation, February – July 2020. Accessed October 9, 2020, <https://platform.marketintelligence.spglobal.com/web/client?auth=inherit#industry/monthlyGeneration>.
52. U.S. Energy Information Administration, Electric Power Monthly, “Table 1.1 Net Generation by Energy Source: Total (All Sectors), 2010-July 2020”, July, 2020. Accessed October 9, 2020. https://www.eia.gov/electricity/monthly/epm_table_grapher.php?t=epmt_1_01.
53. Andrew Gledhill, "Recent COVID-19 Load Impacts," PJM Planning Committee, October 6, 2020. Accessed October 6, 2020, <https://www.pjm.com/-/media/committees-groups/committees/pc/2020/20201006/20201006-item-07a-recent-covid-19-impacts.ashx>.
54. California ISO, “COVID-19 Impacts to California ISO Load & Markets: March 17 – July 26, 2020,” July 31, 2020. Accessed October 6, 2020, <http://www.caiso.com/Documents/COVID-19-Impacts-ISOLoadForecast-Presentation.pdf>.
55. Calvin Opheim and Sarah Parody, “COVID-19 Load Impact Analysis,” July 28, 2020. Accessed October 6, 2020, http://www.ercot.com/content/wcm/lists/200201/ERCOT_COVID-19_Analysis_July_28.pdf.

Sources

56. Calvin Opheim and Sarah Parody, "COVID-19 Load Impact Analysis," August 11, 2020. Accessed October 6, 2020, http://www.ercot.com/content/wcm/lists/200201/ERCOT_COVID-19_Analysis_Aug_11.pdf.
57. Calvin Opheim and Sarah Parody, "COVID-19 Load Impact Analysis," September 1, 2020. Accessed October 6, 2020, http://www.ercot.com/content/wcm/lists/200201/ERCOT_COVID-19_Analysis_Sept_1.pdf.
58. Midcontinent Independent System Operator, "COVID-19 Impact to Load & Outage Coordination," August 17, 2020. Accessed October 6, 2020, https://cdn.misoenergy.org/COVID%2019%20Impacts%20to%20MISO%20Load%20and%20Outage_as%20of%20August%2017469058.pptx.
59. "Estimated Impacts of COVID-19 on Demand," ISO New England Inc. Accessed October 6, 2020, <https://www.iso-ne.com/markets-operations/system-forecast-status/estimated-impacts-of-covid-19-on-demand/>.
60. "COVID-19 Related Updates," New York Independent System Operator. Accessed October 6, 2020, <https://www.nyiso.com/covid>.
61. "SPP's COVID-19 Response - Oct. 1, 2020," Southwest Power Pool, Inc. press release, October 1, 2020. Accessed October 6, 2020, <https://spp.org/newsroom/covid-19/spps-covid-19-response-oct-1-2020/>.
62. "Data Directory," Independent Electricity System Operator. Accessed October 6, 2020, <http://www.ieso.ca/en/Power-Data/Data-Directory>.
63. S&P Global Market Intelligence, Peak Power Price Forwards, October 1, 2020. Accessed October 5, 2020, <https://platform.marketintelligence.spglobal.com/web/client?auth=inherit#markets/commoditiesChart>.
64. "Generation by Fuel Type," PJM Interconnection, LLC. Accessed July 2, 2020, https://dataminer2.pjm.com/feed/gen_by_fuel.
65. "Generational Fuel Mix (xlsx)," Midcontinent Independent System Operator. Accessed July 2, 2020, [https://www.misoenergy.org/markets-and-operations/real-time--market-data/market-reports/#nt=%2FMarketReportType%3ASummary%2FMarketReportName%3AGeneration%20Fuel%20Mix%20\(xlsx\)&t=10&p=3&s=MarketReportPublished&sd=desc](https://www.misoenergy.org/markets-and-operations/real-time--market-data/market-reports/#nt=%2FMarketReportType%3ASummary%2FMarketReportName%3AGeneration%20Fuel%20Mix%20(xlsx)&t=10&p=3&s=MarketReportPublished&sd=desc).
66. "Fuel Mix Report: 2020," Electric Reliability Council of Texas. Accessed July 2, 2020, <http://www.ercot.com/gridinfo/generation>.
67. "Ontario's Energy Capacity," Independent Electricity System Operator. Accessed July 2, 2020, <http://www.ieso.ca/en/Learn/Ontario-Supply-Mix/Ontario-Energy-Capacity>.
68. "GenMixYTD." Southwest Power Pool, Inc. Accessed July 2, 2020, <https://marketplace.spp.org/pages/generation-mix-historical>.

Sources

69. "Supply," California Independent System Operator. Accessed July 2 2020. <http://www.caiso.com/TodaysOutlook/Pages/Supply.aspx>.
70. The New York Independent System Operator Inc. 2020. "Real-Time Fuel Mix." Accessed July 2, 2020, <http://mis.nyiso.com/public/P-63list.htm>.
71. Independent System Operator New England. 2020. "Daily Generation by Fuel Type." Accessed July 2, 2020, <https://www.iso-ne.com/isoexpress/web/reports/operations/-/tree/daily-gen-fuel-type>.
72. Lillian Federico, "Regulators seesaw on shut-off policy, move slowly on COVID-19 cost recovery," S&P Global Market Intelligence, October 5, 2020, accessed October 7, 2020, <https://platform.marketintelligence.spglobal.com/web/client?auth=inherit#news/article?id=60585495&KeyProductLinkType=24>.
73. Paul J Forrester, "California' AB913 Permits Securitization for Recovery of COVID-19 Electric Utility Undercollections," Mayer Brown, September 10, 2020, <https://www.mayerbrown.com/en/perspectives-events/publications/2020/09/californias-ab913-permits-securitization-for-recovery-of-covid-19-electric-utility-undercollections>.
74. Butters, John, "S&P 500 Earnings Season Update: August 7, 2020," August 7, 2020, <https://insight.factset.com/sp-500-earnings-season-update-august-7-2020>.
75. S&P Capital IQ RatingsDirect, "Ratings Direct PageOne", S&P Capital IQ, data accessed October 9, 2020, <https://www.capitaliq.com/CIQDotNet/RatingsDirect/pageone.aspx>.
76. U.S. Department of Treasury, 2020. "Daily Treasury Yield Curve Rates." Accessed October 22, 2020. <https://www.treasury.gov/resource-center/data-chart-center/interest-rates/Pages/TextView.aspx?data=yieldYear&year=2020>.
77. Jason DeParle, "8 Million Have Slipped Into Poverty Since May as Federal Aid Has Dried Up," The New York Times, October 15, 2020. Accessed October 18, 2020, <https://www.nytimes.com/2020/10/15/us/politics/federal-aid-poverty-levels.html>.
78. Emily Benfer et al., "The COVID-19 Eviction Crisis: An Estimated 30-40 Million People in America are at Risk," August 7, 2020. Accessed October 18, https://nlihc.org/sites/default/files/The_Eviction_Crisis_080720.pdf.
79. Temporary Halt in Residential Evictions To Prevent the Further Spread of COVID-19, 85 Fed. Reg. 55292 (September 4, 2020).
80. Mark Henricks and Daphne Foreman, "After the Covid-19 Deluge, A Bankruptcy Tidal Wave?" Forbes, September 23, 2020. Accessed October 5, 2020, <https://www.forbes.com/sites/advisor/2020/09/23/after-the-covid-19-deluge-a-bankruptcy-tidal-wave/#4ac363b94aba>.
81. "Over 6 Million Renters and Homeowners and 26 Million Student Debt Borrowers Missed September Payments," Mortgage Bankers Association press release, October 16, 2020, <https://www.mba.org/2020-press-releases/october/over-6-million-renters-and-homeowners-and-26-million-student-debt-borrowers-missed-september-payments>.

Sources

82. Mary Williams Walsh, “Federal Aid Has So Far Averted Personal Bankruptcies, but Trouble Looms,” The New York Times, July 17, 2020. Accessed October 5, 2020, <https://www.nytimes.com/2020/07/17/business/personal-bankruptcies-coronavirus.html>.
83. American Bankruptcy Institute, “September 2020 Bankruptcy Statistics – State and District,” Data accessed October 19, 2020, <https://www.abi.org/newsroom/bankruptcy-statistics>.
84. American Bankruptcy Institute, September 2020 Bankruptcy Statistics- Commercial Filings, <https://www.abi.org/newsroom/bankruptcy-statistics>.
85. United States Courts, “Bankruptcy Filings Fall 1.8 Percent for Year Ending June 30”, July 29, 2020, <https://www.uscourts.gov/news/2020/07/29/bankruptcy-filings-fall-118-percent-year-ending-june-30>
86. Irum, Tayyeba & Hudgins, Chris, “US bankruptcies surpass 500 mark as coronavirus takes toll”, October 5, 2020, <https://platform.marketintelligence.spglobal.com/web/client?auth=inherit#news/article?id=60607609&KeyProductLinkType=11>.
87. American Bankruptcy Institute, February 2013 Bankruptcy Statistics- Commercial Filings, <https://www.abi.org/newsroom/bankruptcy-statistics>.
88. U.S. Department of the Treasury, “The Cares Act Works for All Americans,” accessed October 14, 2020, <https://home.treasury.gov/policy-issues/cares>.
89. Stephen Roll and Michal Grinstein-Weiss, “Did CARES Act benefit reach vulnerable Americans? Evidence from a national survey,” Brookings Institute, August 25, 2020, accessed October 14, 2020, <https://www.brookings.edu/research/did-cares-act-benefits-reach-vulnerable-americans-evidence-from-a-national-survey/>
90. Thesia I. Garner, Adam Safir, Jake Schild, “Receipt and use of stimulus payments in the time of the Covid-19 pandemic,” U.S. Bureau of Labor Statistics, August 2020, accessed October 14, 2020, <https://www.bls.gov/opub/btn/volume-9/receipt-and-use-of-stimulus-payments-in-the-time-of-the-covid-19-pandemic.htm>.
91. Li Zhou, “Nancy Pelosi sets a deadline this week for getting a stimulus deal before the election,” Vox, October 19, 2020, accessed October 19, 2020, <https://www.vox.com/2020/10/18/21521602/nancy-pelosi-coronavirus-stimulus-deal-congress-mitch-mcconnell>
92. Freedman, David, “Winter will make the pandemic worse. Here’s what you need to know”, MIT Technology Review, October 8, 2020, <https://www.technologyreview.com/2020/10/08/1009650/winter-will-make-the-pandemic-worse/>.
93. Douglas, Jason, “Covid-19 Battle to Intensify as Winter Sets In”, Wall Street Journal, October 16, 2020, <https://www.wsj.com/articles/covid-19-battle-to-intensify-as-winter-sets-in-11602840602>.
94. Yan, Holly, “Covid-19 could kill 2,900 Americans a day in December, researchers say. Here’s why, and how you can make fall and winter better”, CNN, October 5, 2020, <https://www.cnn.com/2020/10/05/health/fall-winter-covid-19-surge-impact/index.html>

Sources

95. IHME, “COVID-19 estimate downloads”, IHME, October 9, 2020, <http://www.healthdata.org/covid/data-downloads>.
96. Lansing, Kevin, “United States: Assessing Recent Stock Market Valuation with Macro Data”, Asia News Monitor, October 16, 2020, <https://www.frbsf.org/economic-research/publications/economic-letter/2020/october/assessing-recent-stock-market-valuation-with-macro-data/>
97. Patton, Mike, “U.S. Stock Market Hits Record 77% Overvalued”, Forbes, August 18, 2020, <https://www.forbes.com/sites/mikepatton/2020/08/18/us-stock-market-hits-record-77-overvalued/#8ad78b6358c1>.
- 98: Mislinksi, Jill, “Market Cap to GDP: An Updated Look at the Buffett Valuation Indicator”, Advisor Perspectives, October 6, 2020, <https://www.advisorperspectives.com/dshort/updates/2020/10/06/market-cap-to-gdp-an-updated-look-at-the-buffett-valuation-indicator>.
99. Fontanella, Lisa, “With US mired in recession, energy allowed returns continue downward spiral”, S&P Global Market Intelligence, October 20, 2020, https://platform.marketintelligence.spglobal.com/web/client?auth=inherit#news/article?id=60832120&KeyProductLinkType=58&utm_source=MIAAlerts&utm_medium=ScheduledAlert&utm_campaign=Alert_Email.
100. “Shiller PE Ratio”, S&P 500 PE Ratio, data as of October 27, 2020, <https://www.multpl.com/shiller-pe>.

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