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
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
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.  

Economy-Wide Drop and Recovery? Disease Outlook
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.

Many GDP forecasts continue to project a significant Q3 2020 rebound, with sustained growth thereafter through 2021.\textsuperscript{11}

- Year over year, \textit{Goldman Sachs} forecasts an overall 3.7\% GDP reduction in 2020, followed by 5.5\% annual growth in 2021. \textsuperscript{11} This compares to a larger 4.2\% drop expected in June this year, with a 5.8\% recovery then seen for 2021. \textsuperscript{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. \textsuperscript{13}

- Similarly, the Fed forecasts a 3.7\% reduction for all of 2020, with a recovery of 4\% in 2021. \textsuperscript{14}

\textit{Source: Goldman Sachs Investment Strategy Group.}
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.\textsuperscript{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%.\textsuperscript{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
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 demand\(^1\) and about 55% of global oil demand.\(^2\) (Of which: 55% light-duty vehicles, 24% commercial and freight trucks, 10% aircrafts; 5% boats, 6% other).\(^3\)

- US storage levels remain elevated at 13% above 5-year range.\(^4\)

- China has reduced purchases by 50% since May after buying 73 MMBbl earlier in the year, capitalizing on low oil prices.\(^5\)

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.\(^6\)
**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

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**Weekly U.S. Gasoline Demand** 27

**U.S. Airport Passenger Screenings** 29

*Source: EIA, accessed September 29, 2020.*
Oil Futures

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

- 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 lockdowns creates downside risk for oil prices

- Paris\textsuperscript{31} and Madrid\textsuperscript{32} have imposed tighter restrictions, with the UK also considering similar measures.\textsuperscript{33}

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

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

Source: S&P Market Intelligence, as of July 2, 2020.
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 – 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

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

Source: S&P Market Intelligence, as of September 30, 2020
Weaker summer demand puts downward pressure on major city-gate pricing hubs relative to historical averages.
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

Source: S&P Global Market Intelligence, as of September 30, 2020.
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.
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)

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

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*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

<table>
<thead>
<tr>
<th>Region</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>PJM</td>
<td>PJM reports: load impacts eased through the summer, but <em>showing signs of re-emerging</em> as the effect of heightened weather sensitivity fades; total energy use down 4.1% in July &amp; August and 4.9% in September; weekday peak down 1.9% in July &amp; August and 3.4% in September.</td>
</tr>
<tr>
<td>CAISO</td>
<td>CAISO reports: <em>since the beginning of stay-at-home orders, weekday average load reductions of 2.4%</em> (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.</td>
</tr>
<tr>
<td>ERCOT</td>
<td>ERCOT reports: <em>no COVID-19 impacts on daily peak demand</em> during the summer; weekly energy use down 1%.</td>
</tr>
<tr>
<td>MISO</td>
<td>MISO reports: <em>lower load reduction of 1.5% and 1.3% in July and August,</em> respectively (compared to 5.1% in June) due to lifting of restrictions and reopening of manufacturing and retail; <em>change in load shape</em> due to COVID-19 related measures.</td>
</tr>
<tr>
<td>ISO-NE</td>
<td>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 <em>load continues to trend toward what would be expected in the absence of COVID-19</em> through the first week of October.</td>
</tr>
<tr>
<td>NYISO</td>
<td>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; <em>reduction in electric demand from commercial customers leading driver of overall reduced electricity consumption.</em></td>
</tr>
<tr>
<td>SPP</td>
<td>SPP reports: <em>system has largely returned to pre-pandemic levels,</em> with average or above-average load on the aggregate consistently since late June.</td>
</tr>
</tbody>
</table>
| U.S. Overall | EIA predicts *2.2% less electricity consumption* in 2020 relative to 2019.  
-8.6% decline for commercial sales  
-5.6% decline for industrial sales  
-3.2 increase for residential sales  
EIA also forecasts *10% decrease in energy-related CO₂ emissions* in 2020 (relative to 2.8% in 2019). |
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.

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.

Weekly Average Hourly Load: March-June

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

Change in MISO load reflected on right hand axis
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)**

*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.

Day Ahead Average Monthly LMPs

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. ERCOT North data reflects settlement point prices.
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%. *

\[ \text{Generation by Fuel Type (GWh)} \]

\[
\begin{array}{c|c|c|c|c|c|c|c|c|c|c|c|c|c|c}
\hline
\text{Fuel Type} & \text{PJM} & \text{MISO} & \text{ERCOT} & \text{CAISO} & \text{NYISO} & \text{ISO-NE} & \text{IESO} \\
\hline
\text{Gas} & \text{2,276} & \text{1,782} & \text{1,040} & \text{466} & \text{315} & \text{260} & \text{372} \\
\text{Coal} & \text{-11%} & \text{-19%} & \text{-18%} & \text{+22%} & \text{-9%} & \text{+12%} & \text{-5%} \\
\text{Other Fossil Fuels} & \text{2,019} & \text{1,438} & \text{965} & \text{474} & \text{287} & \text{232} & \text{354} \\
\text{Wind} & \text{-6%} & \text{-16%} & \text{-25%} & \text{+25%} & \text{-3%} & \text{-6%} & \text{-23%} \\
\text{Other Renewables} & \text{-43%} & \text{+32%} & \text{-23%} & \text{0%} & \text{-12%} & \text{-6%} & \text{+21%} \\
\text{Solar} & \text{+26%} & \text{0%} & \text{0%} & \text{-8%} & \text{+25%} & \text{0%} & \text{-23%} \\
\text{Nuclear} & \text{0%} & \text{-23%} & \text{-36%} & \text{+27%} & \text{0%} & \text{+0%} & \text{-21%} \\
\text{Hydro} & \text{0%} & \text{0%} & \text{0%} & \text{-12%} & \text{+25%} & \text{0%} & \text{-21%} \\
\hline
\end{array}
\]

\[ \text{Note: 19% decline estimate includes PJM, MISO, SPP, CAISO, NYISO, ISO-NE, and IESO.} \]
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

Status of US COVID-19 cost recovery mechanisms

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

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

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

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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
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.
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.

**National Exchange Stock Indices in 2020**

- **South Korea (+7%)**
- **U.S. (+4%)**
- **China (+4%)**
- **Sweden (2%)**
- **Japan (-2%)**
- **Germany (-4%)**
- **Canada (-6%)**
- **Australia (-15%)**
- **France (-20%)**
- **Italy (-20%)**
- **U.K. (-23%)**
- **Spain (-30%)**

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

- 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.

% 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%)
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.

VIX Index Levels in 2020

<table>
<thead>
<tr>
<th>Period</th>
<th>VIX Index Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dot Com, 9/11</td>
<td>25.4</td>
</tr>
<tr>
<td>Hurricane Katrina</td>
<td>14.9</td>
</tr>
<tr>
<td>Financial Crisis</td>
<td>35.1</td>
</tr>
<tr>
<td>Post-Crisis</td>
<td>22.7</td>
</tr>
<tr>
<td>Modern Era</td>
<td>14.9</td>
</tr>
<tr>
<td>COVID-19 Mar-20</td>
<td>57.7</td>
</tr>
<tr>
<td>COVID-19 Apr-20</td>
<td>41.5</td>
</tr>
<tr>
<td>COVID-19 May-20</td>
<td>30.9</td>
</tr>
<tr>
<td>COVID-19 June-Aug 20</td>
<td>27.0</td>
</tr>
<tr>
<td>COVID-19 Sep-20</td>
<td>27.6</td>
</tr>
</tbody>
</table>

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.

**Market Yields for Treasury Bonds**

*January through October 2020*

*Source: U.S. Department of the Treasury, data as of October 1, 2020.*
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%.
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% or 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
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.  

- 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.”
- Ch. 11 bankruptcies (one category of commercial bankruptcy filings), have already begun to rise in 2020.

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.

2020 Commercial Bankruptcies by Sector

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

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%).

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.
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.
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. 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.

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.

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.
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


Sources


Sources

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