

Impacts and Implications of COVID-19 for the Energy Industry

Assessment through June 2020

PREPARED BY

Frank Graves
Tess Counts
Josh Figueroa
Bob Mudge
Lily Mwalenga
Shivangi Pant

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THE **Brattle** GROUP

PURPOSE and CAVEATS

This report provides an update to our [initial compilation and assessment](#) of the impacts of COVID-19 on electric and natural gas utilities in early April. Like our prior report, it reflects 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 pandemic continues to have devastating effects on healthcare, education, business activity, and employment. However, social distancing regimes in most states are being relaxed. Thus, it is possible we have seen as much energy demand destruction as will occur as a direct effect of social distancing.

Lingering and more difficult questions about the indirect effects of COVID-19 involve how quickly we can get back to more normal commerce, how much irreversible destruction of businesses will have occurred, and how demand patterns (consumption habits) may change over the long term. Utilities are being asked to bear some of this risk, but deferred cost recovery mechanisms may themselves be strained if the pandemic lasts too long.

This assessment reflects the perspectives and opinions of the authors and does not necessarily reflect those of The Brattle Group's clients or other consultants.

Agenda

Section 1: COVID-19 Path and Macroeconomic Projections

Section 2: Energy and Financial Sector Impacts

- Oil & Gas demand and prices
- Electricity loads, load shapes and prices
- Generation mix impacts
- Renewable energy developments
- Regulatory reactions
- Financial impacts on valuations, interest rates, risk

Section 3: 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.

1. COVID-19 Path and Macroeconomic Projections

Economy-Wide Drop and Recovery?

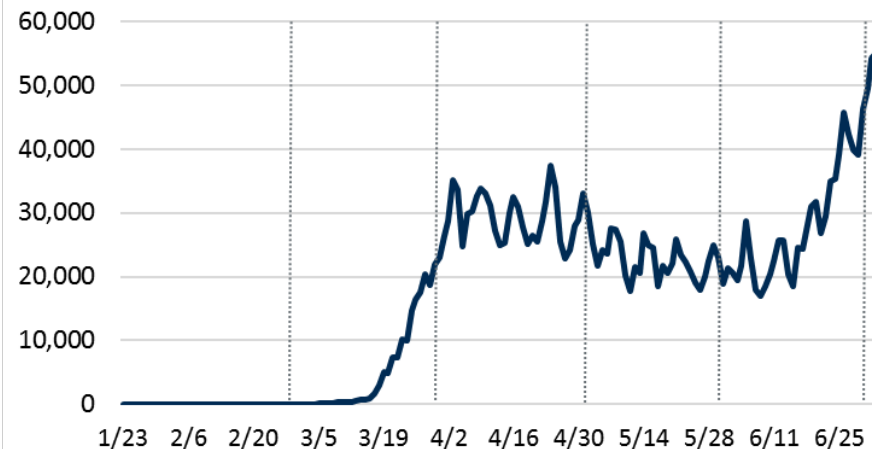
Disease Outlook

COVID-19 infections in the U.S. have increased throughout June, averaging 20% more infections over the month than May; the end of June and beginning of July have shown the greatest reported daily infections in the history of the pandemic, with around 55,000 reported infections daily.

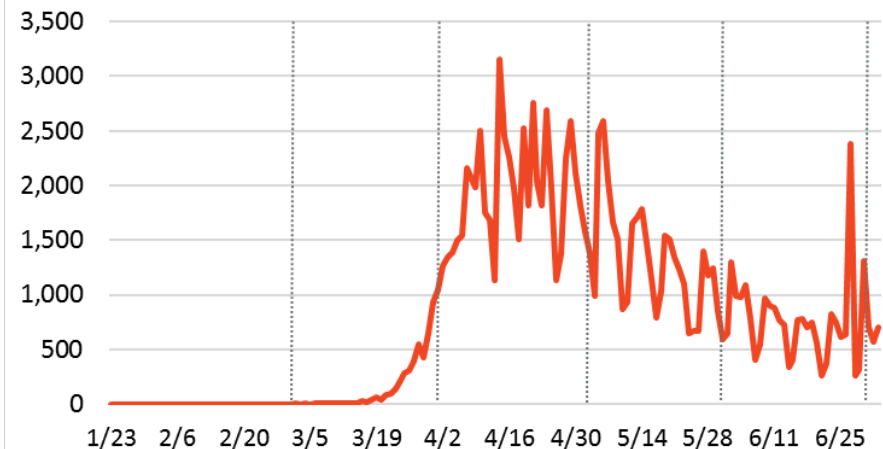
- Although daily deaths have not grown as rapidly as infections, the U.S. cumulative deaths are steadily increasing, reaching over 128,000 by July 3.

Daily COVID-19 Related Statistics in U.S.
CDC Statistics as of July 3¹

Daily Infections



Daily Deaths



Economy-Wide Drop and Recovery?

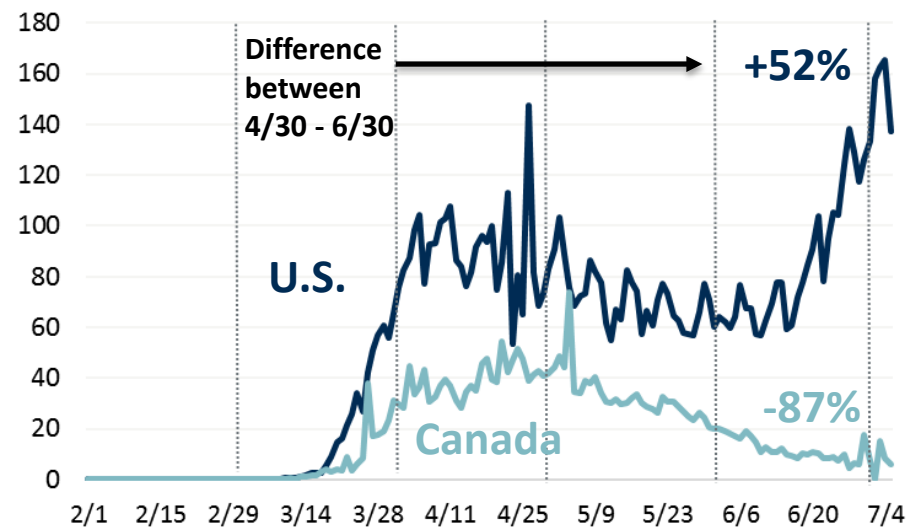
Disease Outlook – Canada

According to the European Centre for Disease Prevention and Control (ECDC)'s July 5th report, since the end of April, Canada has experienced an 87% decline in daily infections, while the U.S. has seen a 52% increase as of June 30.³

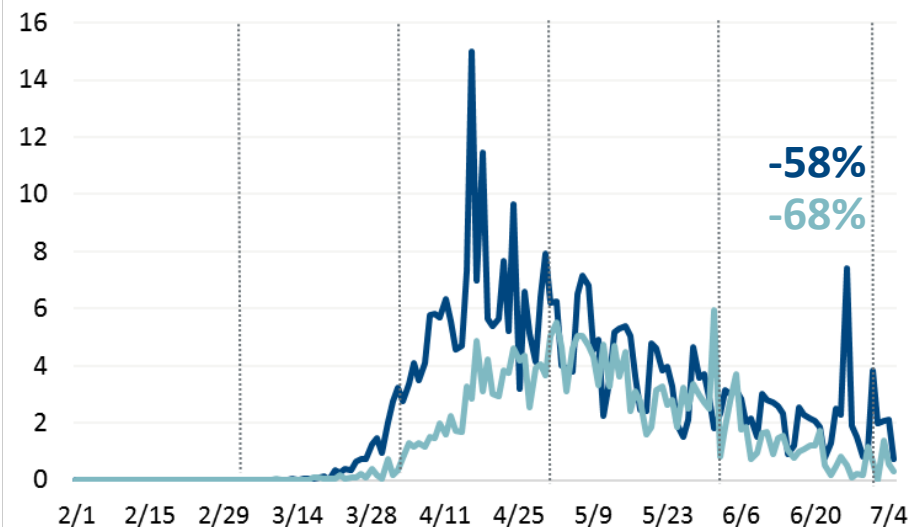
- Both the U.S. and Canada have experienced a general decline in daily deaths since April, with 58% and 68% declines, respectively.
- Based on IHME data, Ontario has below-average death and infection rates per capita, compared to Canada's overall country statistics.²

COVID-19 Related Statistics in U.S. & Canada ECDC Projection as of July 5³

Daily Infections per Million Residents



Daily Deaths per Million Residents

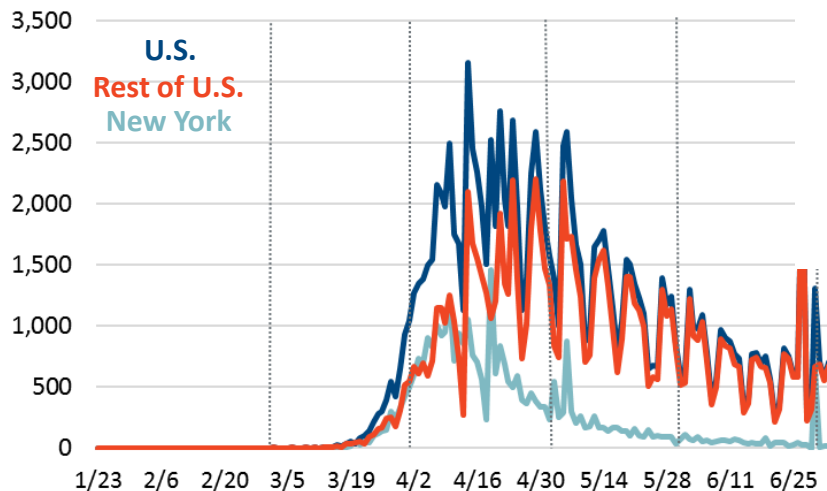


Stabilizing or Still Growing?

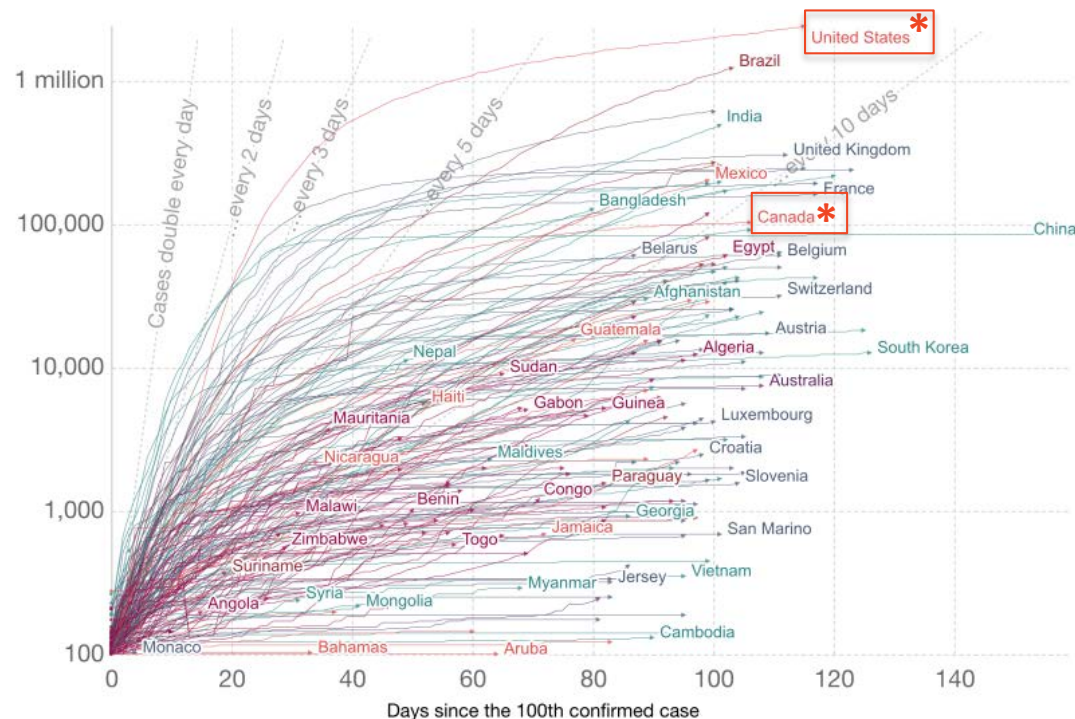
The U.S. has 25% of worldwide cases but only about 5% of the population.

- U.S. death rate has been declining since April, and its infections' doubling time has declined (~10-20 days) – but is still higher than average on a global scale and locally higher in some states.
- NY accounted for more than 50% of all U.S. deaths, but has accounted for less than 10% of daily U.S. deaths in June on average.

Daily COVID-19 Related Deaths¹



Growth in Number of Confirmed COVID-19 Cases since Inception⁴



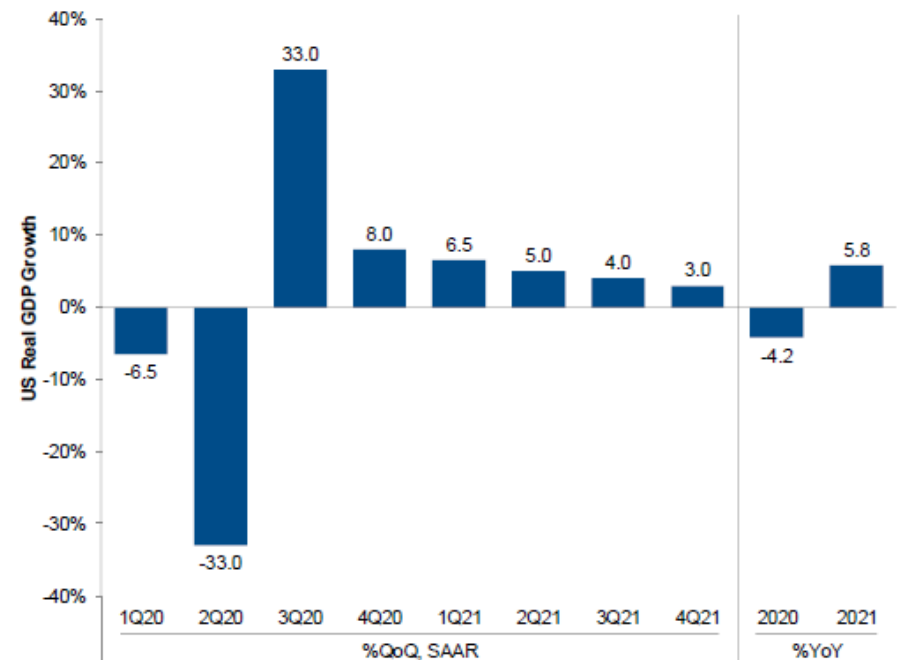
Source: The Visual Capitalist, data as of June 26, 2020.

Economy-Wide Drop and Recovery? Macroeconomic Components

Most forecasts for Q2 2020 project a deep reduction in GDP, as large as -30-35%, *e.g.*, as forecasted by Goldman Sachs. But then there is mostly continued expectation of a quick recovery, with GDP rebounding and growing back almost as fast Q3 2020.⁵

- On a year over year basis, **Goldman** forecasts an overall **4.2% GDP reduction in 2020**, followed by 5.8% annual growth in 2021
- As of July 2, the CBO predicts a year over year **decline of 5.8% in real GDP in 2020**, followed by a 4% recovery in 2021.⁶
- Similarly, **the Fed** forecasts a **6.5% reduction** for all of 2020, with a recovery of 5% in 2021.⁷
- The average decline affects certain sectors much harder than others. A recent **PWC** April report suggested that **some sectors**, such as transportation & hotels and food services & bars, are **experiencing reductions in revenues of as much as 50%.**⁸

U.S. Real GDP Growth Forecasts⁵



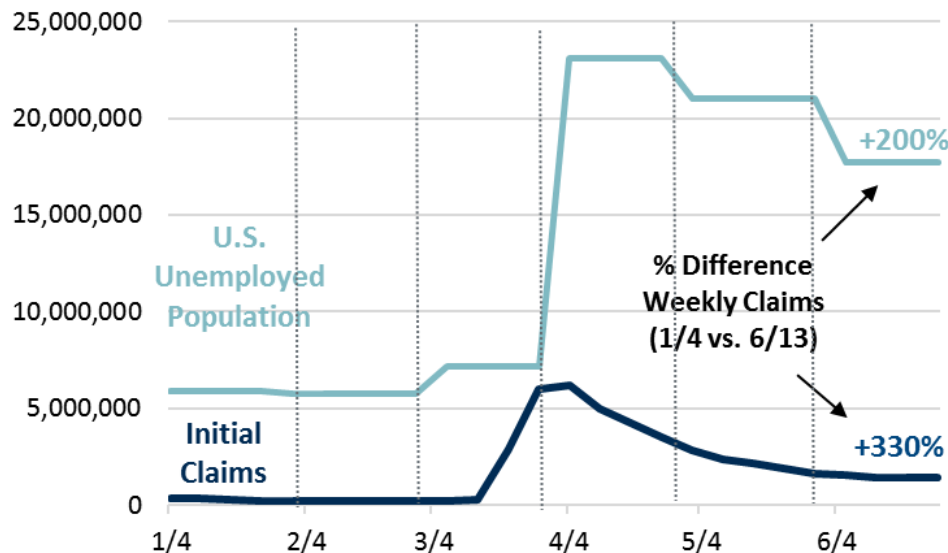
Source: Goldman Sachs Global Investment Research.

Economic Impacts on Individuals

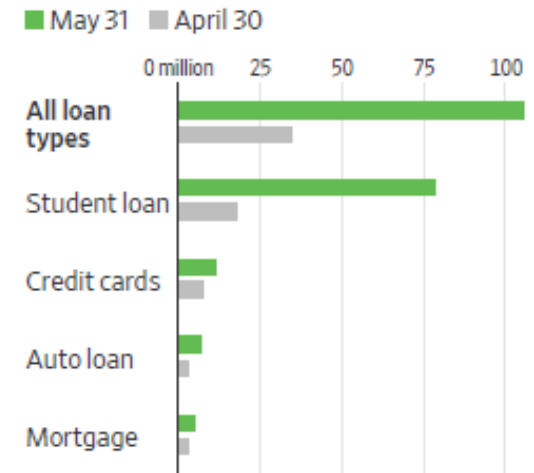
With U.S. total jobless claims roughly 3X begin-of-year levels, there is concern regarding personal and commercial limits on ability to endure continuing economic hardship.⁹

- Although initial monthly unemployment claims have decreased since April, the *CBO forecasts that unemployment will decline from about 10% to 5% over the coming decade, averaging 6.1% through 2030, which is well above the pre-pandemic levels of 3.7%.⁶*
- As of the end of May, over 106 million loan accounts had been granted some sort of deferred payments or relief status, with student loans being the most skipped payments (79 million accounts).

U.S. Jobless Claims^{10, 11, 12}



Delayed Payments (Millions)⁹



Source: The Wall Street Journal, June 18, 2020.

2. Energy and Financial Sector Impacts

Oil & Refined Products – Spot prices

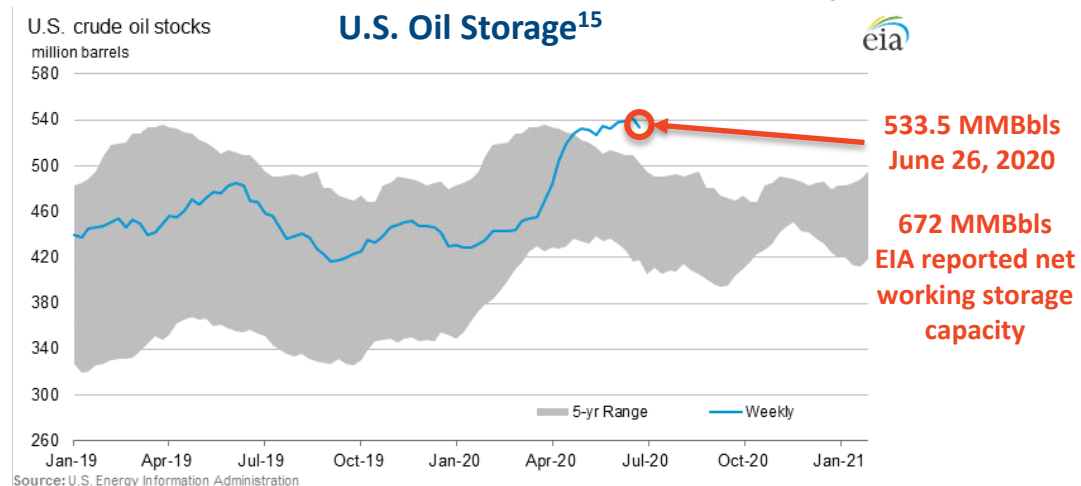
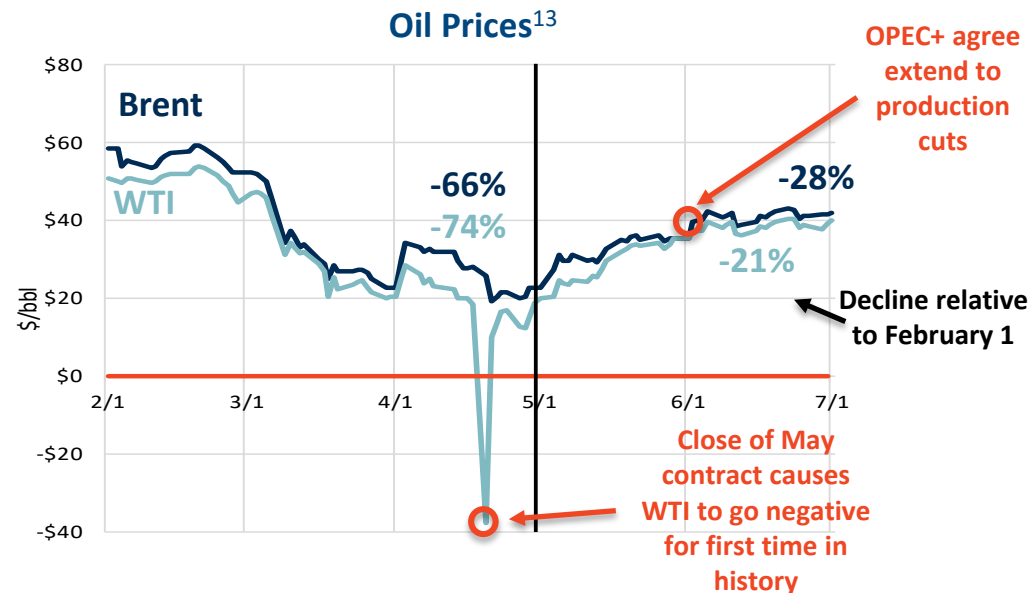
Oil prices have recovered since the end of April as OPEC+ and U.S. production cuts have taken effect -- but prices remain 20-30% below pre-COVID-19 levels at around \$40/bbl.¹⁶

- OPEC production levels are lowest since the Gulf War in 1991¹⁴
- In June, U.S. oil production hit 10.5 Mmbpd, the lowest level in two years, down from a record high of 13 Mmbpd earlier in 2020¹⁵

In June, OPEC+ agreed to extend 9.7 Mmbpd production cuts (10% of pre-COVID-19 demand levels) through end of July.¹⁷

U.S. oil storage currently stands at 533.5 Mmbbl (~79% full).¹⁵

China capitalized on low prices to buy 73 Mmbbl (75% of global daily demand) on 59 tankers currently floating off its coast, which has helped support prices.¹⁸



Oil Futures

Oil futures have rebounded significantly since May, but markets are still pricing in a slow recovery (with forward prices below those in Feb 2020 through late 2020s).

WTI and Brent futures for 2020-26 have increased by 11%-14% since May 1:¹⁹

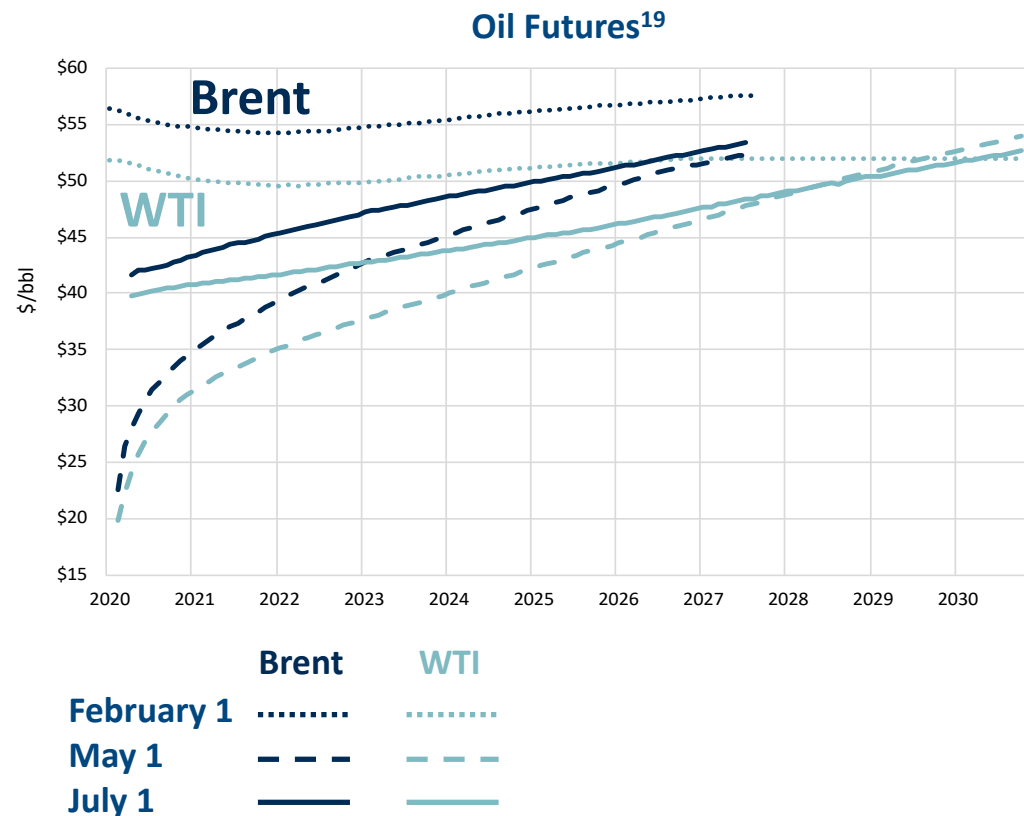
- Reopening of global economies combined with production caused futures to rise
- Futures remain 14% below pre-COVID-19 levels

Goldman Sachs estimates global oil demand will not recover to pre-COVID-19 levels until 2022:²⁰

- Global oil demand will decline by 8% in 2020 and rebound by 6% in 2021.
- Gasoline and diesel markets to recover fastest (by 2021) but jet fuel demand won't recover until 2023.

Lower oil prices continue to have major impacts on the oil industry:

- Chesapeake Energy filed for bankruptcy on June 28.²¹
- Shell and Chevron took \$22B and \$10B write-downs, respectively due to lower energy prices.²²



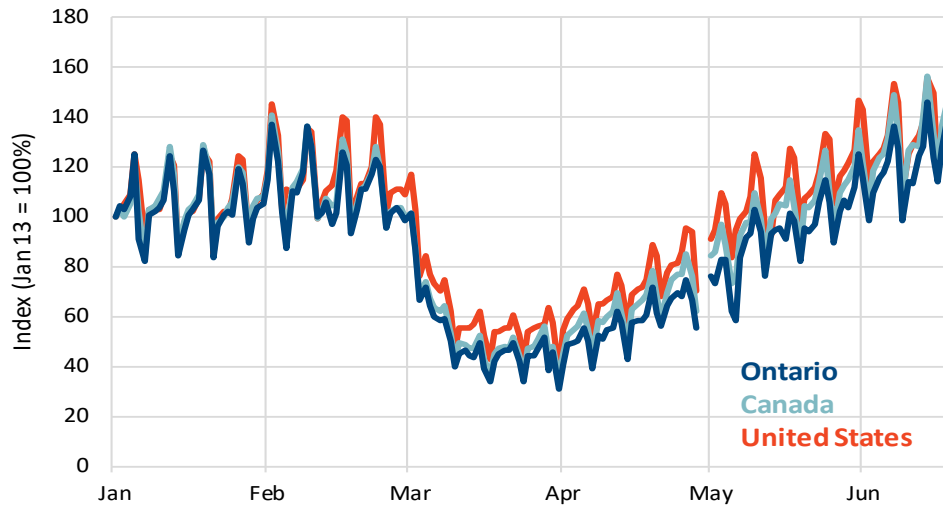
Source: S&P Market Intelligence, as of July 2, 2020.

U.S. Gasoline Prices

Vehicle travel has returned to near pre-COVID-19 levels as many regions reopen, and gasoline prices have followed higher. ²³

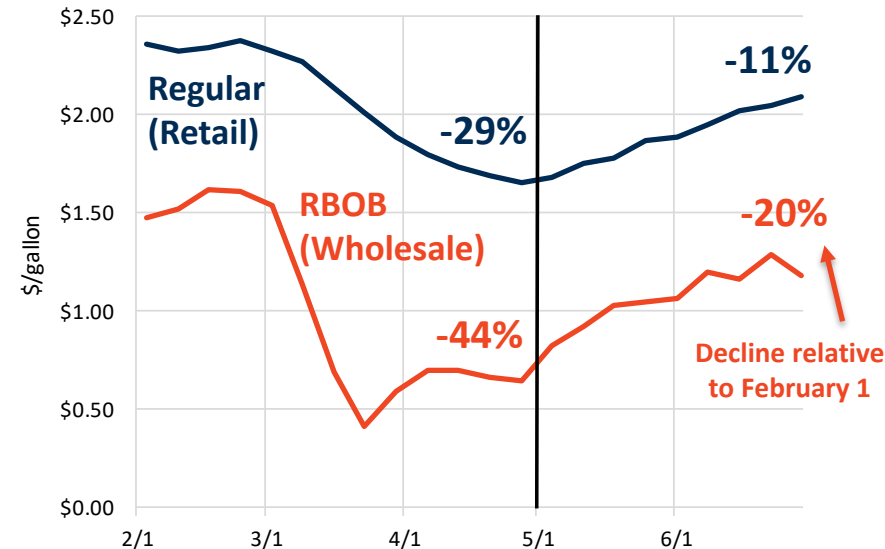
- Gasoline margins between wholesale and retail have returned to beginning of the year levels of \$0.80/gallon after doubling to \$1.60/gallon at the end of March. ^{13,24}
- Retail gasoline prices are 18% below 2019 levels despite heading into the typically high demand 4th of July Weekend, according to EIA data. ²⁴

Relative Vehicle Travel²³



Source: Apple Mobility Trends, accessed July 2, 2020.

Retail US Gasoline^{13,24}



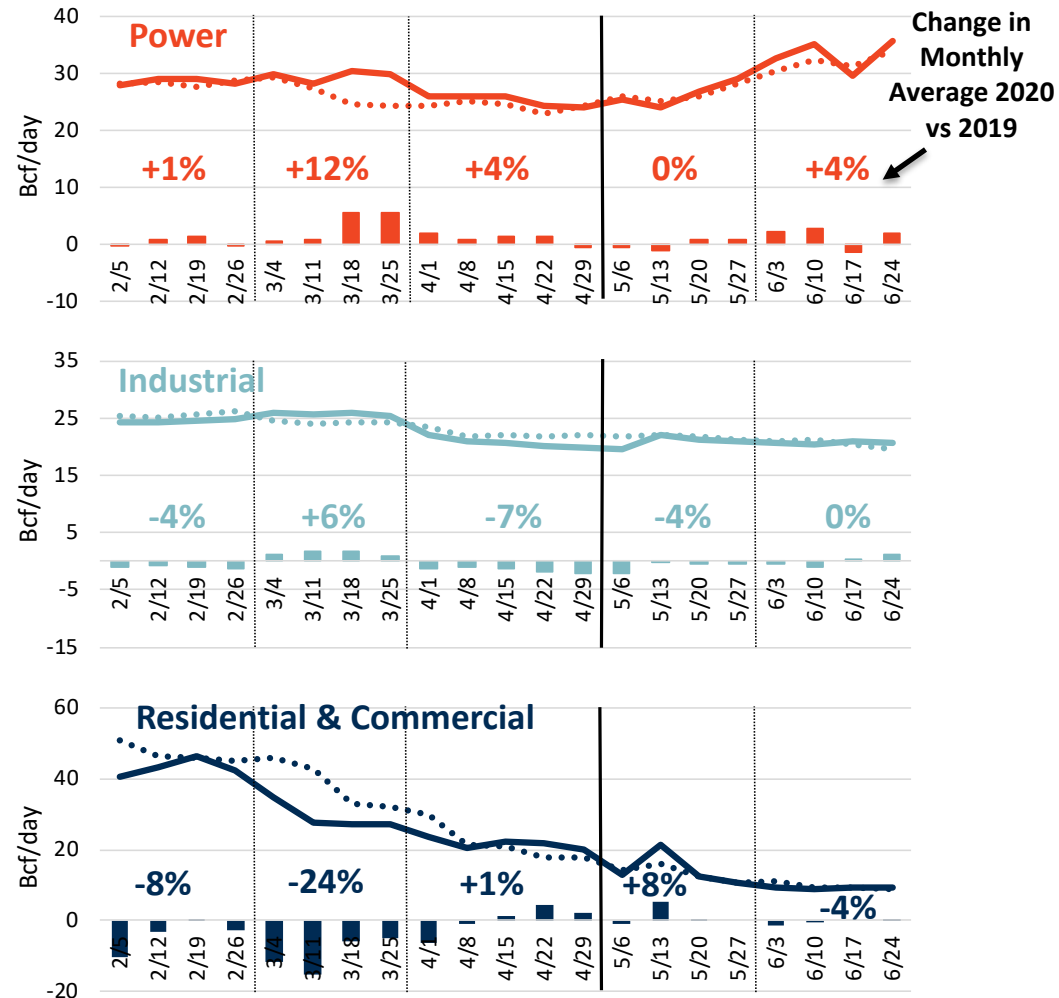
Source: U.S. EIA and S&P Global Market Intelligence, as of July 2, 2020.

Natural Gas – Demand

Natural gas demand has only been modestly affected by COVID.

- Natural gas for **power generation** increased in June due to warmer temperatures, with average June power demand up 4% compared to last year.
- In May and June, **industrial** demand returned to past normal levels, recovering from a 7% y.o.y. decrease in April.
- **Residential & commercial** demand declined in the first few months of the pandemic but this was mostly due to normal seasonality; they are now relatively in-line with 2019.

Natural Gas Demand – 2020 vs. 2019²⁵

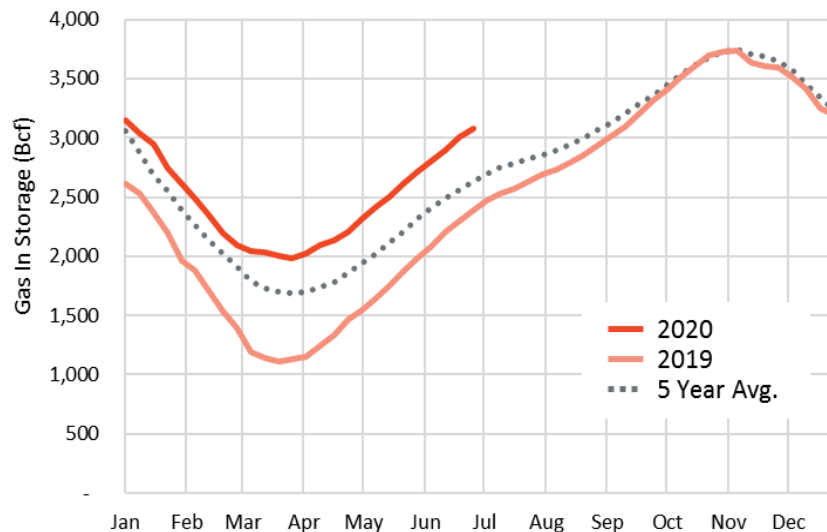


Natural Gas – Storage Levels

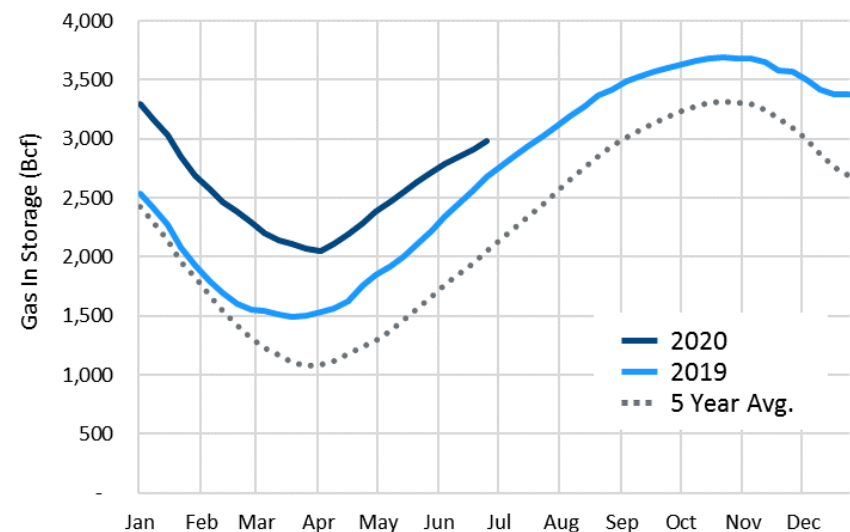
Lower global natural gas demand has led storage levels to build faster relative to prior years, particularly in Europe, echoing prior storage concerns in the oil markets.

- European natural gas storage is currently at 85% of total capacity, based on country reported data²⁷
- Both Europe and the U.S. storage levels are 3 months ahead of the 5-year average.
- China and Japan, the two largest LNG importers, have smaller natural gas storage capacities than Europe and the U.S. (360 Bcf in China and 590 Bcf in Japan).^{28,29}

United States²⁶



Europe²⁷



Natural Gas – LNG

Global LNG prices remain under pressure; U.S. export volumes have fallen significantly in May and June.

Global LNG prices remain 50-60% below beginning of the year due to lower demand and elevated storage volumes³⁰

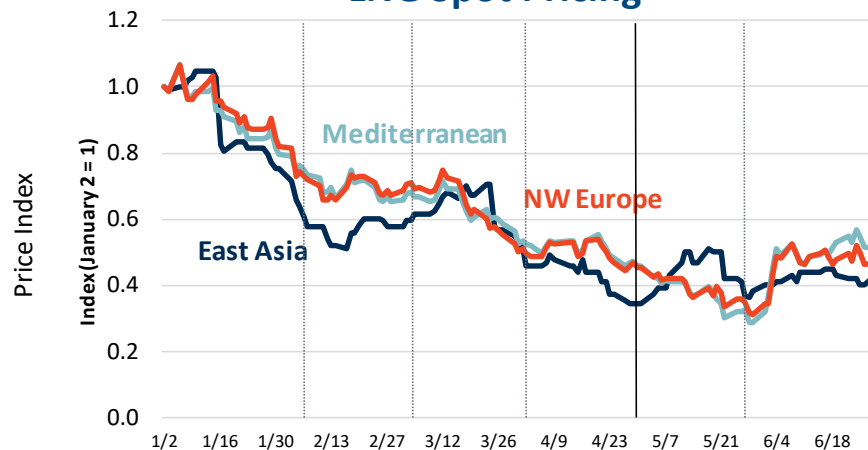
It is estimated that 20 U.S. LNG Cargoes were cancelled in June, which caused export volumes to fall ~85% relative to March³¹

- An additional 45 cargoes in July and 40 cargoes in August are expected to be cancelled, equivalent to ~5 Bcf/day or 7.5% of current daily U.S. demand³¹
- Goldman Sachs estimates cancellations will add more than 760 Bcf to U.S. gas storage³²
- Lower export volumes are putting downward pressure on Henry Hub prices

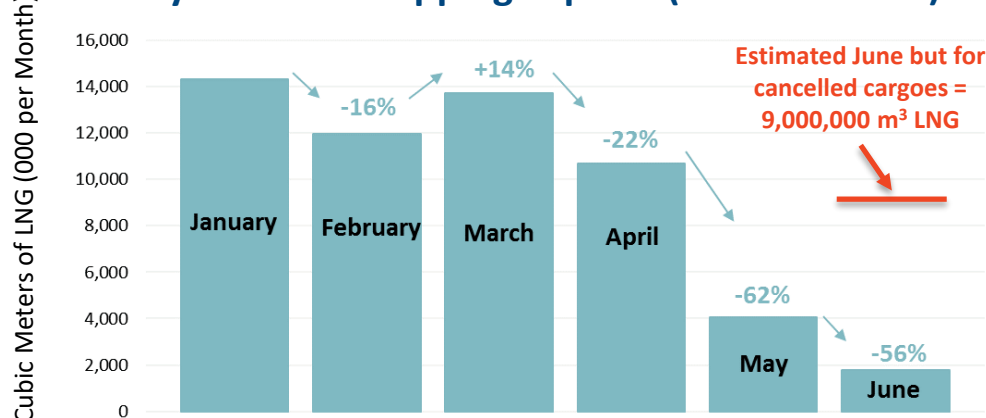
Utilization at Sabine Pass, the largest U.S. export terminal, reached a 16-month low in June³³

Japan's LNG imports fell to an 11-year low in May, due to COVID-19's impact on the economy.³⁴

LNG Spot Pricing³⁰



Monthly U.S. LNG Shipping Exports (Jan-June 2020)^{30,35}



Note: June averaged through June 24, 2020.

Natural Gas – Futures

Lower export volumes coupled with high domestic storage levels caused the August Henry Hub contract to decline 25% by July since the beginning of May.

Forward curve fell by about \$0.20 (-8%) on average since the beginning of May due to over supply concerns.

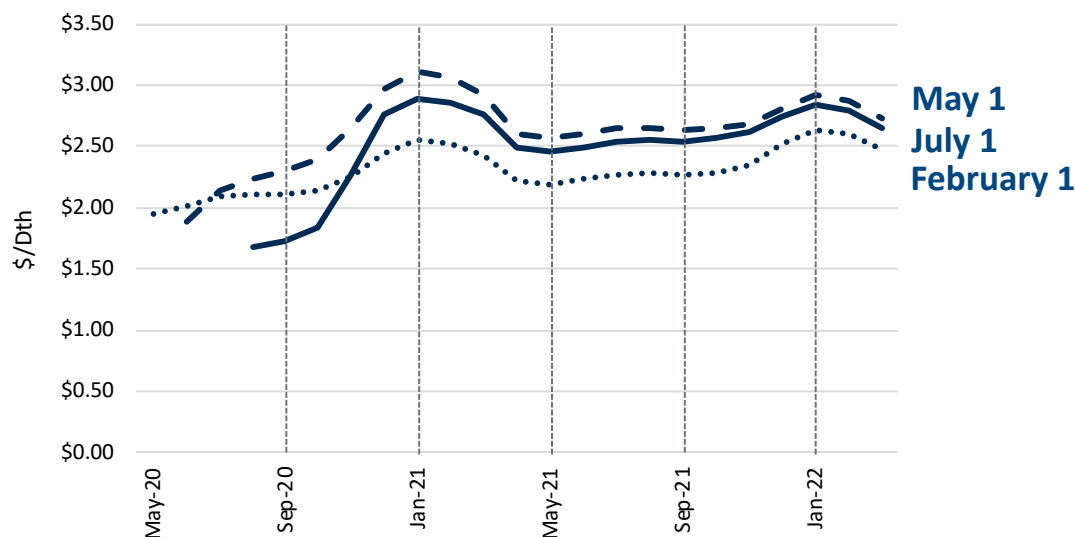
- Futures curve remains elevated relative to pre-COVID-19 levels
- High U.S. storage levels could lead to further reduction in winter prices.

Long-dated forwards are now above pre-COVID (February 2020) levels.

Summer/Winter 2021 spread (Aug to Jan) increased by 42% since May 1st to \$1.22, driven by lower summer prices

- August 2020 contract fell by \$0.57 (-25%) whereas January 2021 prices only fell by \$0.21 (-7%) relative to May 1st

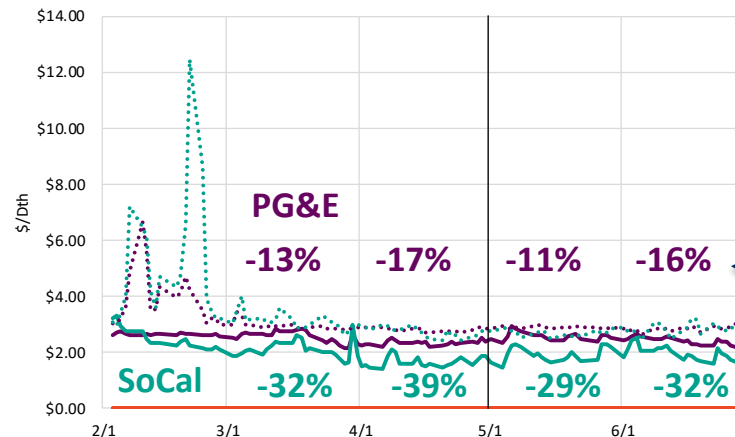
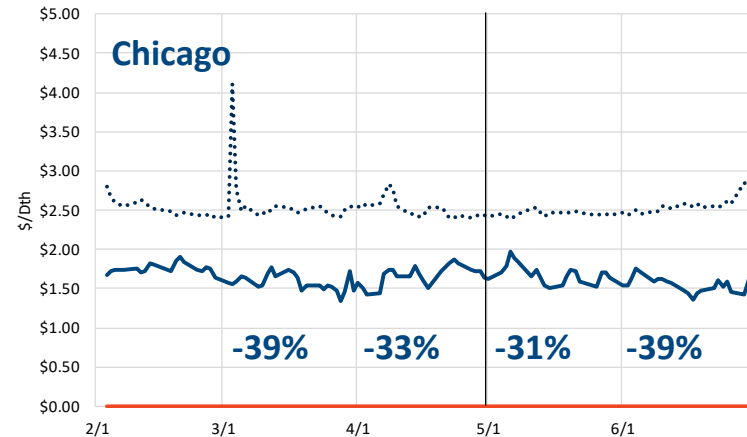
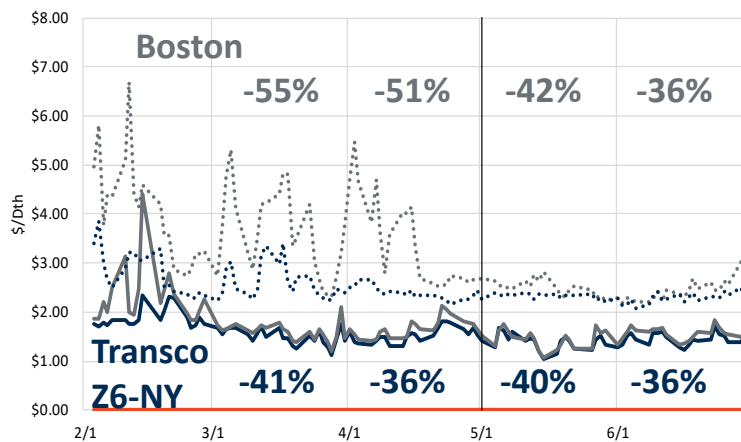
Henry Hub Futures³⁶



	August 2020	January 2021	August 2021	January 2022
February 1 To July 1	-\$0.44 (-21%)	\$0.34 (13%)	\$0.28 (12%)	\$0.20 (8%)
May 1 To July 1	-\$0.57 (-25%)	-\$0.21 (-7%)	-\$0.10 (-4%)	-\$0.07 (-3%)

Natural Gas Spot Prices in Demand Regions

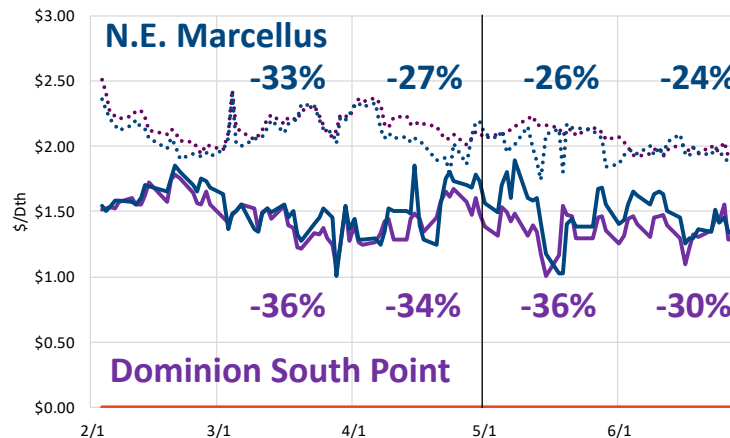
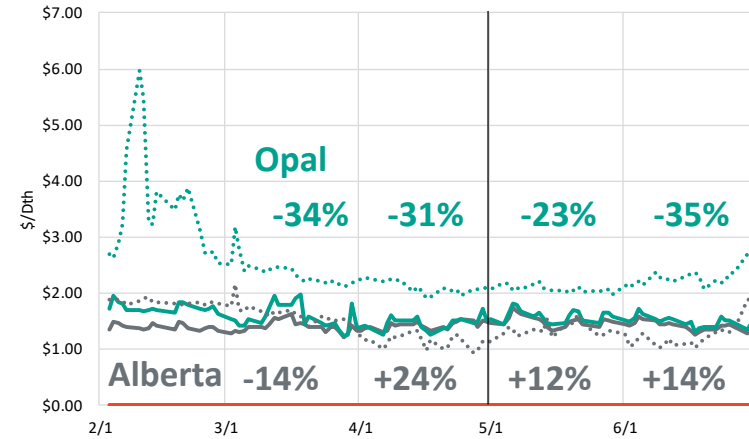
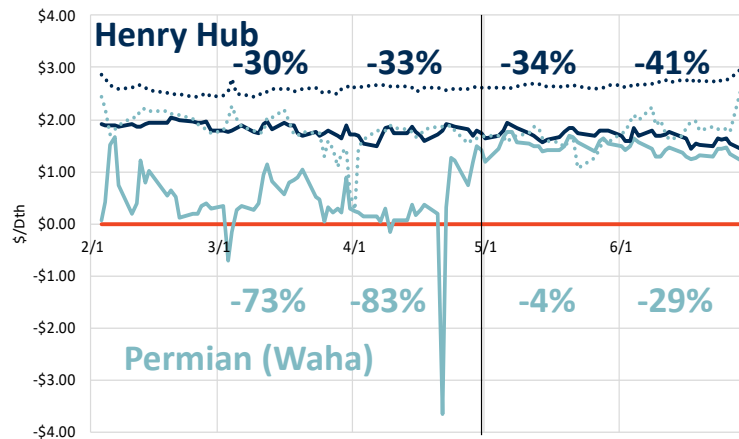
Demand-area prices have remained fairly steady for the past 2-3 months, though they are well below prices in same months last year.



Average Monthly Price Month vs. 4 Year Average Price³⁷

Natural Gas Spot Prices in Supply Regions

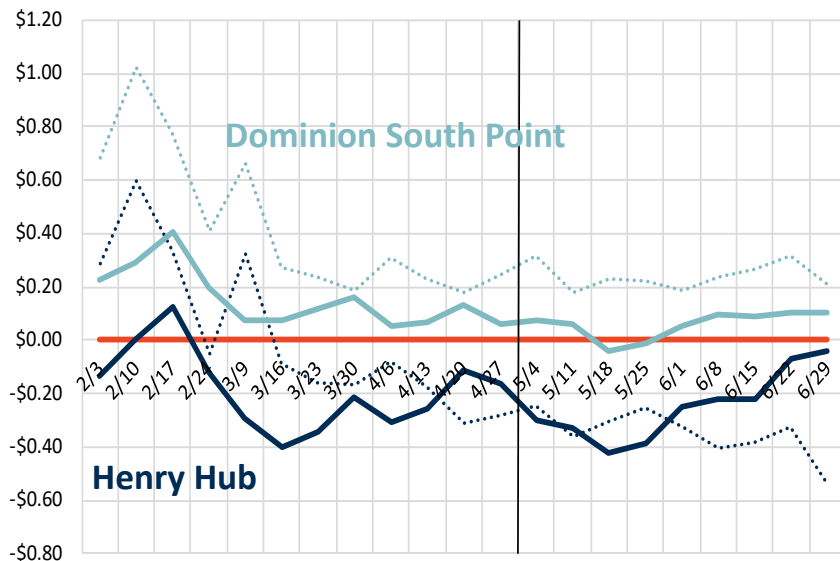
Permian prices now trading at Henry Hub levels as a result of lower oil and associated gas production in West Texas.



Average Monthly Price Month vs. 4 Year Average Price³⁷

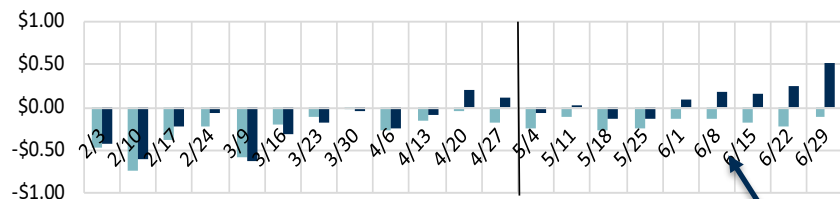
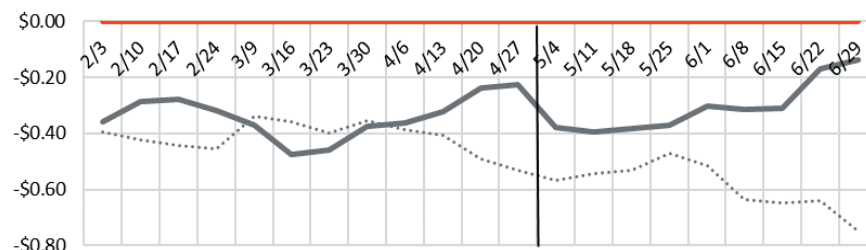
Natural Gas – Weekly Basis Differentials

To New York City³⁷



As Henry Hub prices fall due to storage concerns and lower export demand, basis differentials to the Northeast are flattening.

Henry Hub to Dominion South Point³⁷



Spreads Calculated as: Destination - Origin

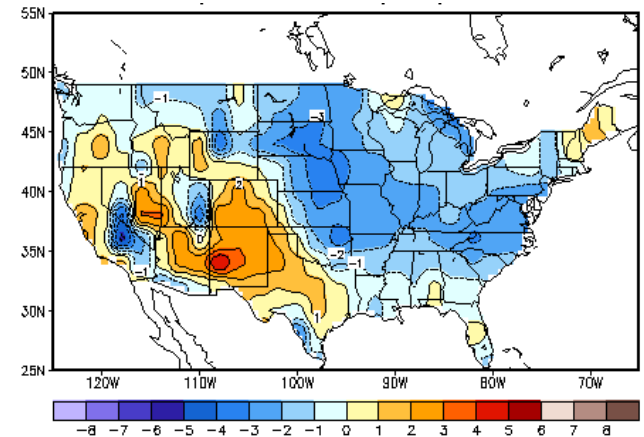
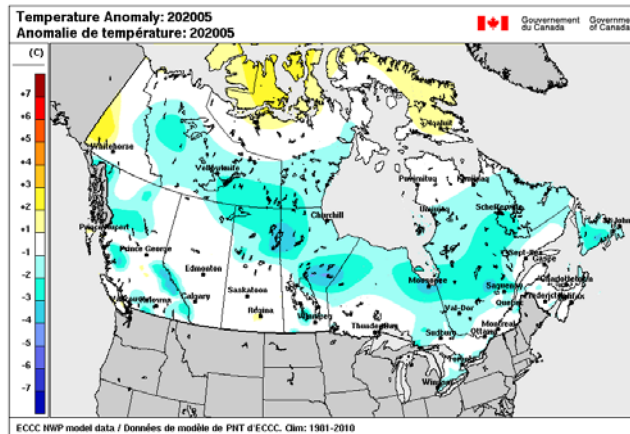
Difference from
4 Year Average

Weather

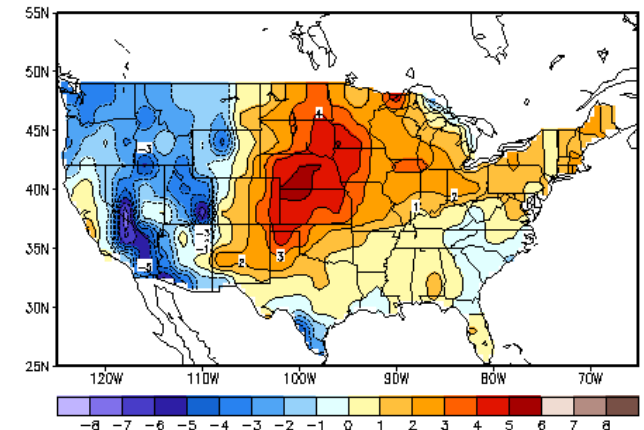
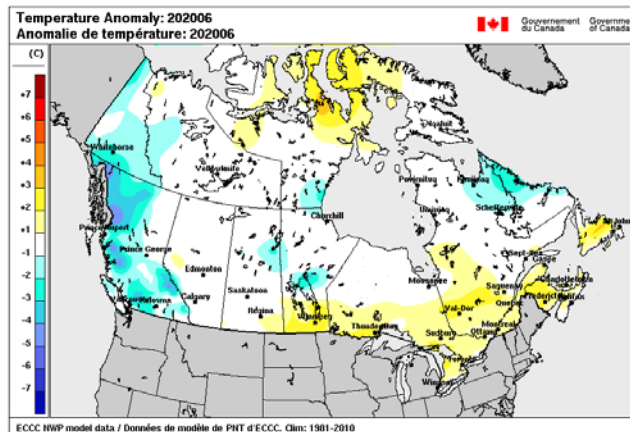
May was slightly colder than normal in the U.S. and Canada, while warmer than average temperatures were felt in June in populous areas.

Deviation between Average Actual and Normal (°F)^{38,39}

May 2020



June 2020



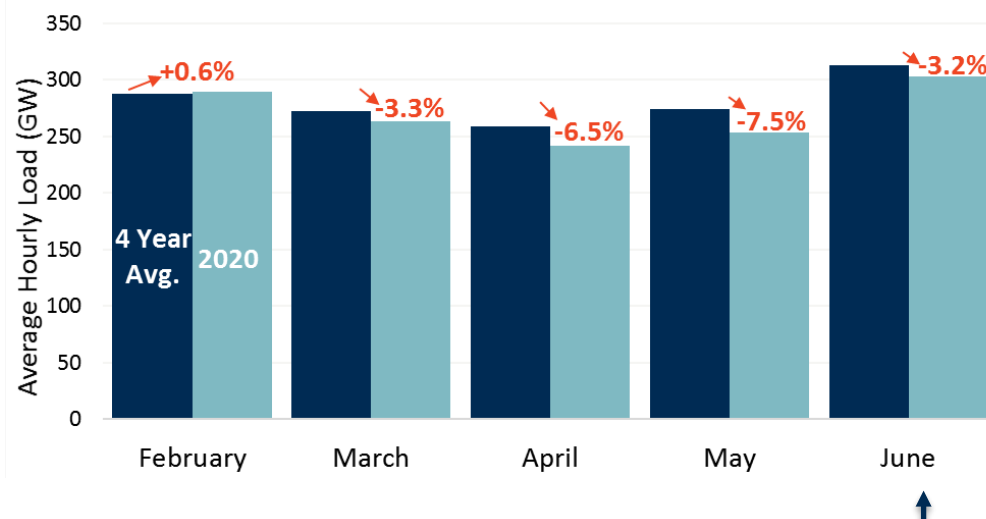
Impact on Regional Electric Loads

Compared to the prior 4-years, June 2020 average hourly power loads for seven major ISOs* dropped 3.2% in June, less than half the 7.5% reduction experienced in May.

- The -7.5% load reduction in May may be about as deep as will occur from social distancing and COVID-19, *barring bankruptcies and other economic fallout.*
- The load reduction in June was about the same as March levels (~-3%), as stay-at-home orders relaxed across the country.

According to the EIA, residential load increased by 8% during April compared to April 2019, while commercial load decreased by 11% and industrial load by 9% across the U.S.⁴⁰

7 ISOs' Electricity Load* in February-June 2020 Relative to Load for Prior 4 Years (2016-2019)⁴¹



COVID-19 effect in June is roughly half as large as in April and May, as stay-at-home orders relax across the U.S.

Note: *CAISO, MISO, ISO-NE, NYISO, PJM, ERCOT and SPP; collectively, these ISOs represented approximately 55% of total U.S. load in February through April 2019.^{42, 43}

ISO Comments on COVID-19 Impacts

IESO is reporting an average 10% reduction in energy consumption through mid-June due to COVID; U.S. 7 ISOs have reported load reductions of 3-10% between March and June.

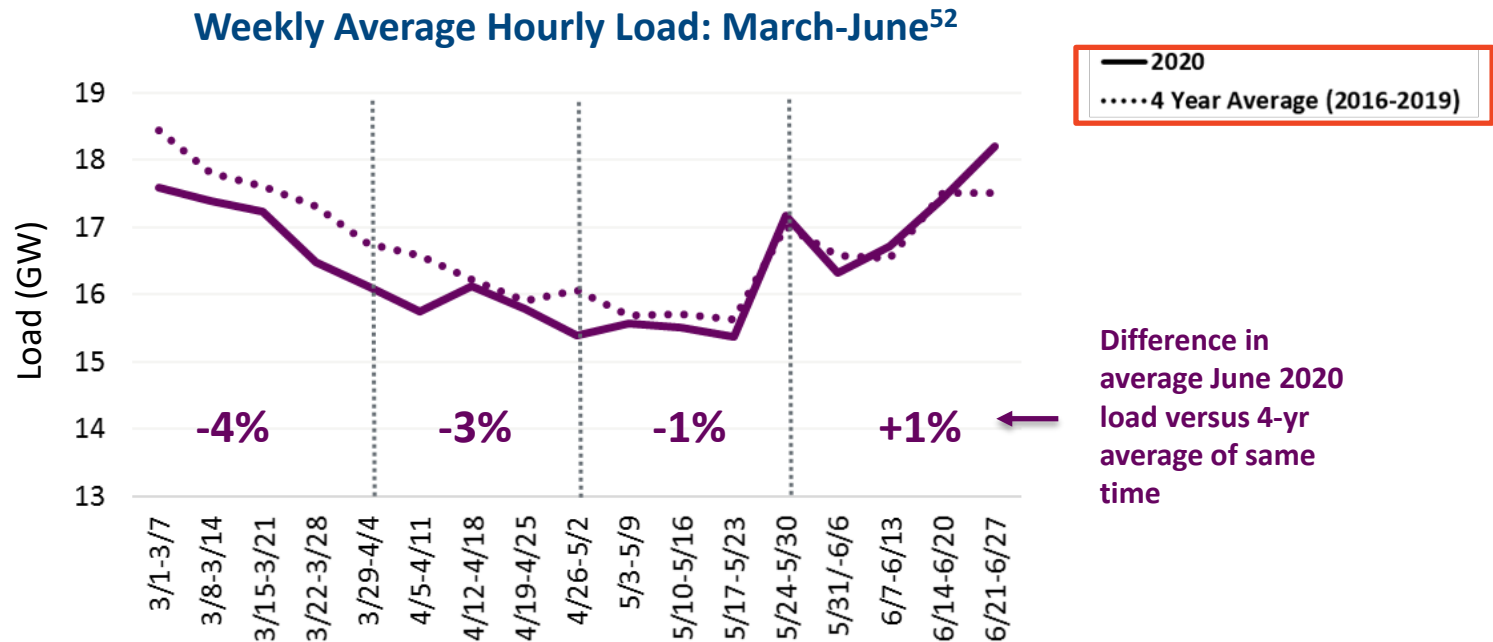
Estimates of Load Reduction due to COVID-19^{44,45,46,47,18,49,50,51}

Ontario	IESO reports: average 10% reduction in energy consumption and 9% reduction in peak demand due to closures; demand has recovered by 4% - 12% (segment dependent) since June 12, but residential energy consumption down 4% .
PJM	PJM reports: total daily energy use down 14% in the first half of May and 6% - 11% from May 16 to June 3; weekday peak down 10% between late March and May 26.
CAISO	CAISO reports: weekday average load reductions of 3.3% (up to 6.1% in peak hours); weekend average load reductions of 1.2% (up to 2.4% in peak hours). Energy prices down by about \$10/MWh in DA and RT markets
ERCOT	ERCOT reports: no COVID-19 impacts on daily peak demand in June; weekly energy use down 1% .
MISO	MISO reports: load reduction of 5.1% in June (compared to 10.6% in May); change in load shape due to COVID-19 related measures.
ISO-NE	ISO-NE reports: system demand down 3-5% through early June; air conditioning load from recent warmer weather and limited expansion of re-opening policies resulting in higher loads than would be expected absent COVID-19 response.
NYISO	NYISO reports: decline of overall energy use by 2-9% in June (varies by week); reduction in electric demand from commercial customers leading driver of overall reduced electricity consumption.
SPP	SPP reports: a 7-10% reduction in load from the week of April 26 to mid-May.
U.S. Overall	EIA predicts 5.7% less electricity consumption in 2020 relative to 2019. -9.1% for commercial sales -6.7% for industrial sales -1.5% for residential sales EIA also forecasts 14% decrease in energy-related CO₂ emissions in 2020 (relative to 2.8% in 2019).

Impact on Regional Electric Loads - IESO

For reference, the methodology used for our U.S. ISO load reductions shows that IESO has experienced more moderate load declines in the pandemic period, with June 2020 load slightly exceeding average 2016-2019 load by 1%.

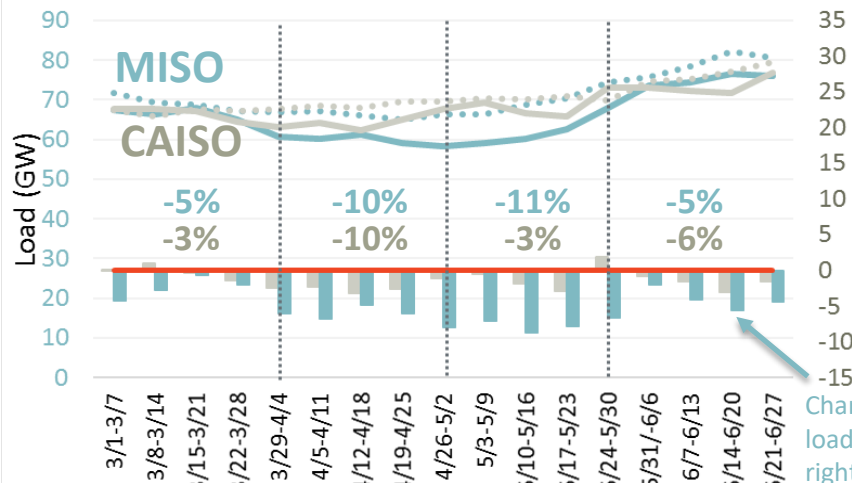
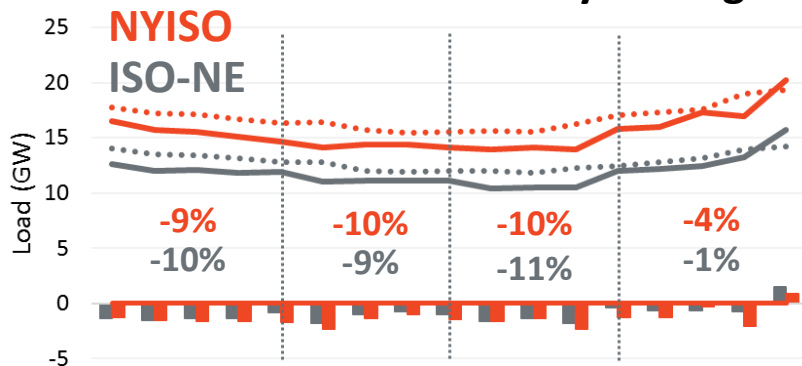
- This may be underestimating the effect of COVID-19, e.g. if weather has caused 2020 loads to be higher than normal in the past few months or there has been significant load growth over the past few years.



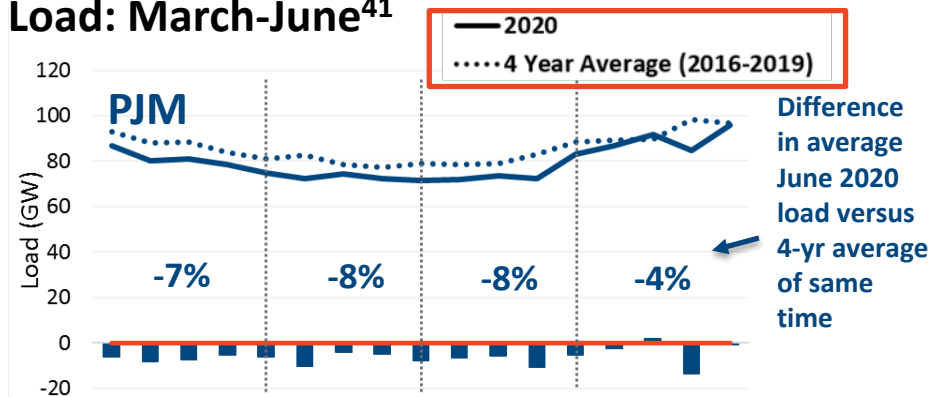
Impact on Regional Electric Loads

The U.S. ISOs, except ERCOT and SPP, have shown declining % load losses likely due to COVID in June compared to prior months; ERCOT continues to show an absolute increase in load due to overall market growth.

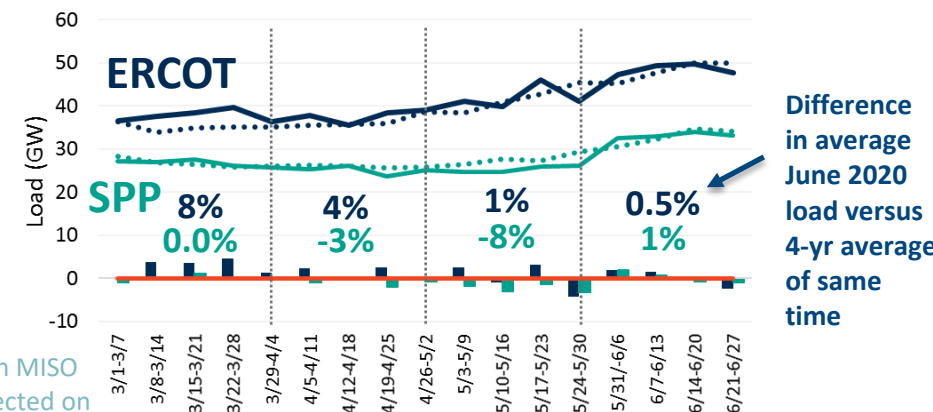
Weekly Average Hourly Load: March-June⁴¹



Change in MISO load reflected on right hand axis



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



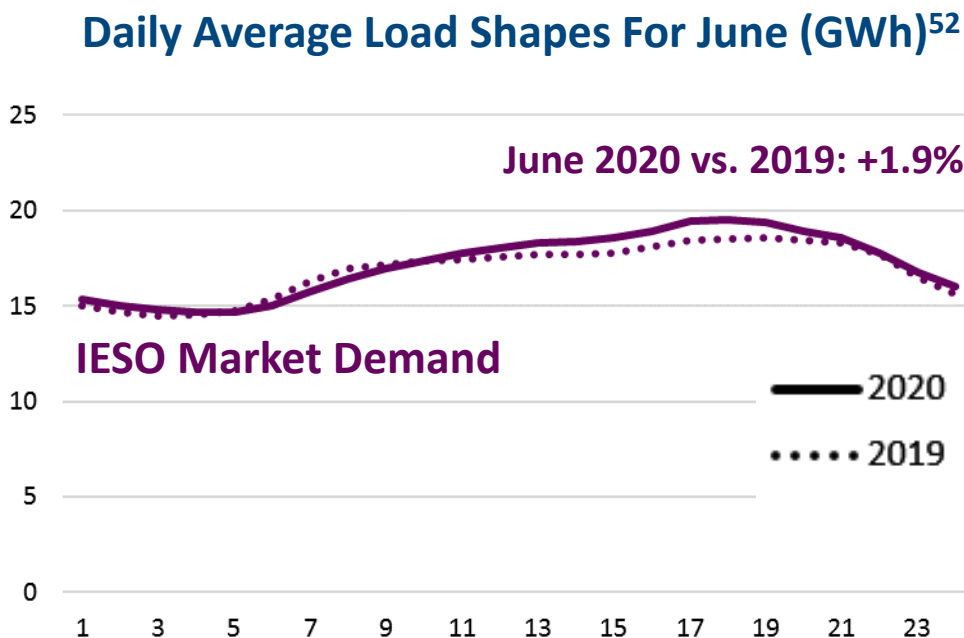
Difference in average June 2020 load versus 4-yr average of same time

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

Qualitatively, IESO shows similar patterns to the other U.S. ISOs in our study: the load shapes across ISOs have remained largely unchanged.

- IESO has experienced higher daily average load in June 2020 vs. June 2019.
- But, IESO measures a decrease in peak of around 9%, when comparing two specific days in April (4/10/2019 vs. 4/3/2020).

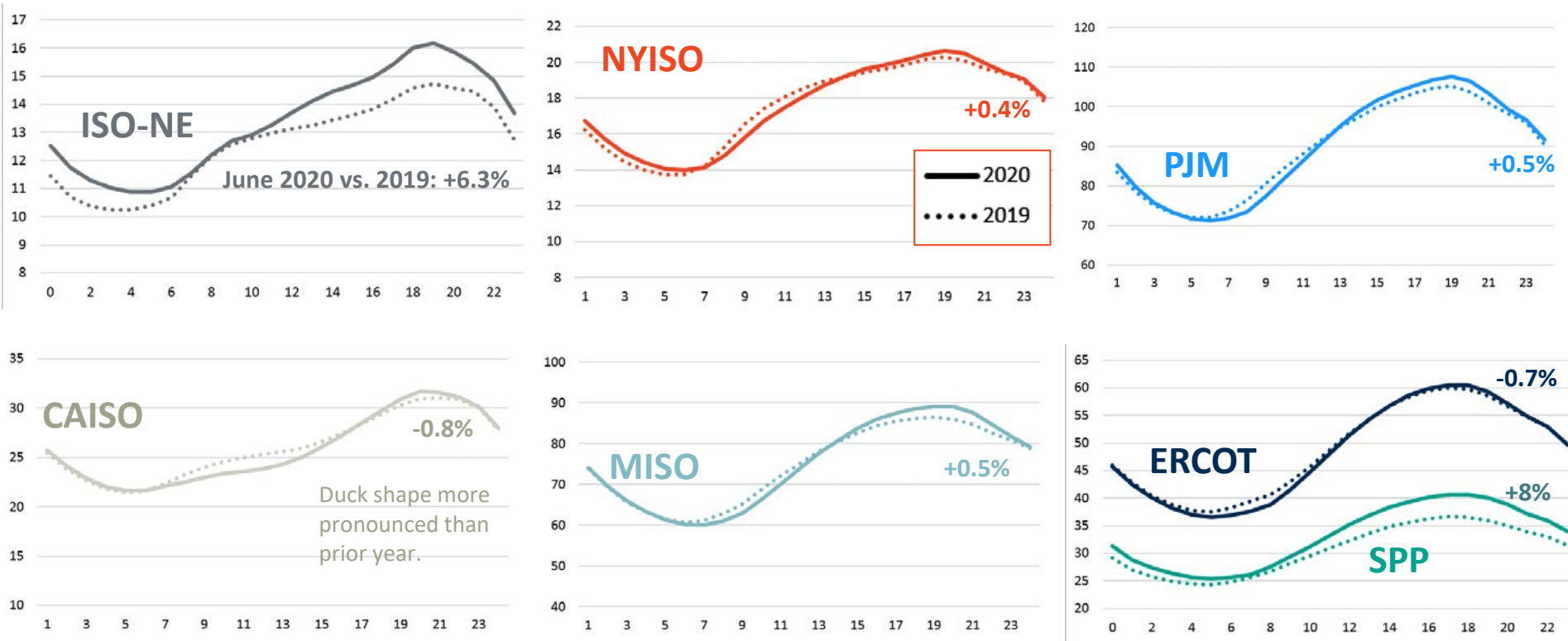


This analysis averages across all days in June versus IESO's analysis, which concentrates on two single day comparisons.

Impact on Regional Electric Load Shapes

- The load shapes across ISOs have remained largely unchanged, except for **CAISO** and **ERCOT** which have higher late afternoon peaks in 2020 than 2019.
- Except **CAISO** and **ERCOT**, all of the ISOs have higher load levels in June 2020 versus June 2019.

Daily Average Load Shapes For June 2020 vs. June 2019 (GWh)⁴¹



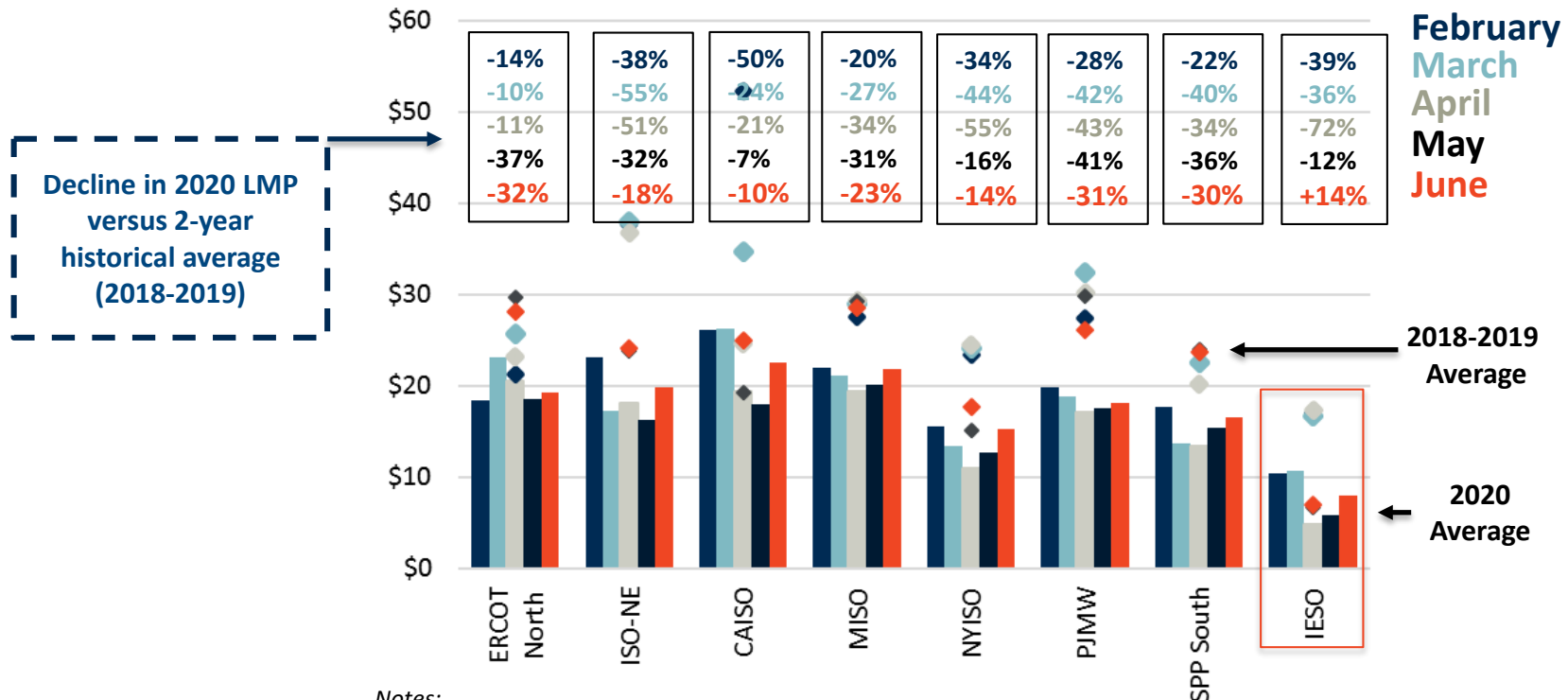
Note: March 2019 load was 17% lower than the average of 2016-2018 in CAISO.

Impact on Spot Electricity Pricing

Daily LMPs have fallen in every ISO in almost every month from February through April 2020, compared to their past 2-year averages.

- Not necessarily due to COVID, but this will strain viability for some coal and nuclear plants.

Day Ahead Average Monthly LMPs^{41,52}



Notes:

IESO data reflects HOEP data, without the global adjustment. Converted from Canadian dollars using a conversion rate of 0.75, the annual average as of July 3rd.⁵³

ERCOT North data reflects settlement point prices.

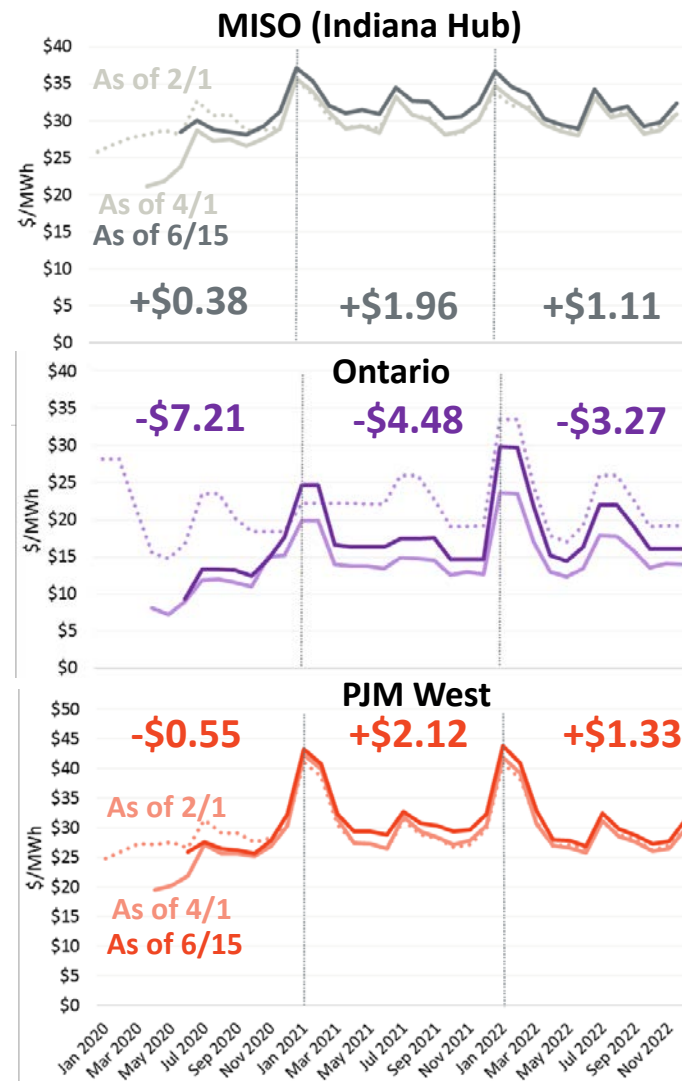
Power Price Forwards in Last 3 Months

At US ISO hubs, average on-peak forward prices fell dramatically and universally by April for front months, but not for late 2020 and beyond, which are a bit above February levels.

- Long-dated forwards for **PJM West** and **MISO** are slightly (\$2 to \$3/MWh) above pre-COVID levels
- By contrast **Ontario** power forwards have stayed \$3-\$7/MWh below February levels for most months

Note: All prices reported in USD.

On-Peak Power Price Forwards⁵⁴



Renewable Energy Long Term Development Plans & Incentives

Slowing?

There is an increasing number of reported project delays/cancellations, equipment sourcing challenges, supply chain and construction delays, and potential layoffs of employees.^{55,56,57}

- NYSERDA announced pause in NY 2020 offshore wind solicitation (1,000-2,500 MW), but with no reductions in long term goals.⁵⁸
- New Jersey, New York, Pennsylvania, and Michigan have suspended renewables construction during the pandemic, as part of non-essential construction stoppage.^{59,60,61,62}
- Unemployment claims data shows that the clean energy industries lost 106,472 jobs in March (a 3% drop in the workforce), and forecasts estimate up to 15% drop if no actions to support the industries.⁶³

Financing risk and uncertainty are compounding delays.⁶⁴

- While interest rates are down, lender credit standards are more stringent.
- Tax equity may be squeezed by lower taxable income among investors.

Potential consolidation of small developers.

Growing?

Worldwide lockdowns and social distancing measures have triggered a historic decline in emissions, increasing public appreciation for improved climate conditions.⁶⁵

- IEA estimates an 8% global reduction in CO₂ emissions relative to 2019, the lowest emissions levels since 2010.⁶⁶
- This is far above the annual reductions under the 2015 Clean Power Plan, which aimed to reduce U.S. CO₂ emissions 32% below 2005 levels by 2030.⁶⁷

Several states have affirmed continued commitments to long term clean energy policies.

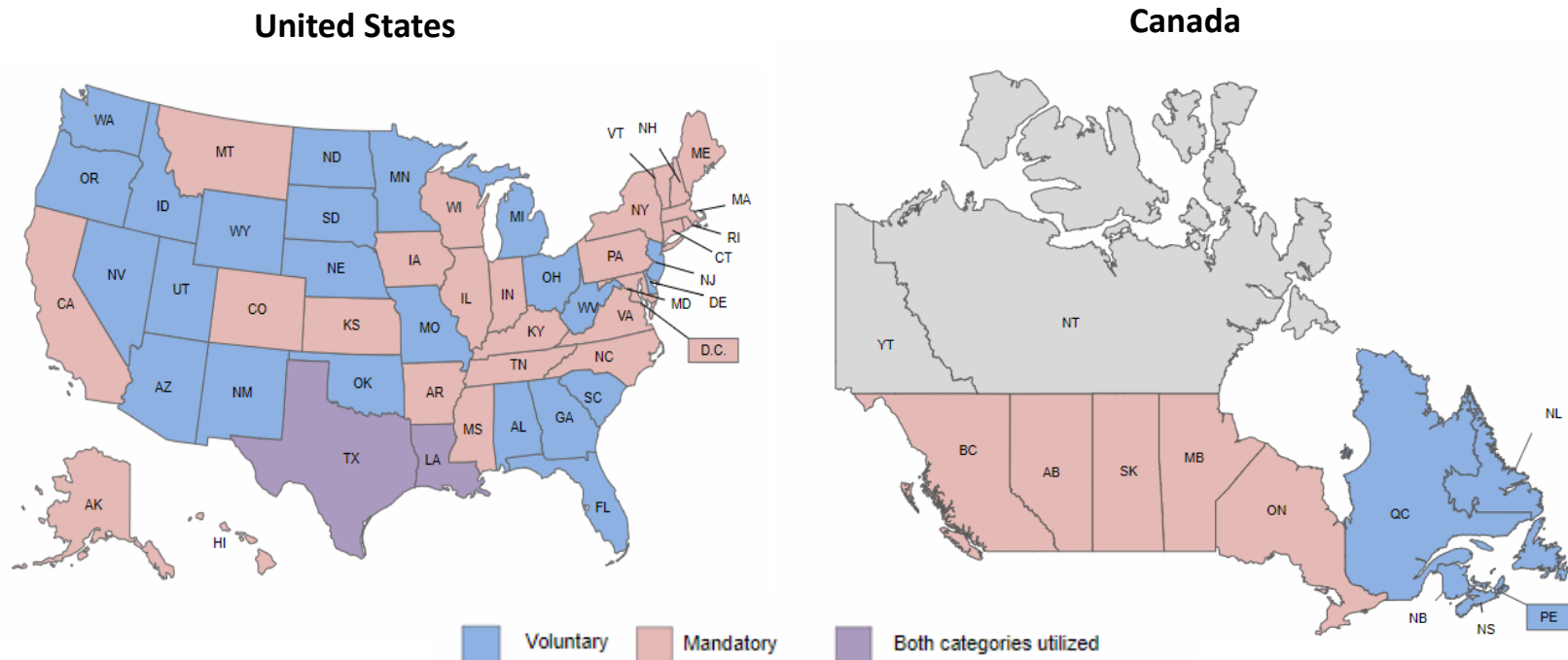
- New York governor unveiled details of 21 large-scale solar, wind, and energy storage projects (1,278 MW) across upstate NY in March.⁶⁸
- The Virginia Clean Economy Act, signed in April, sets goals of 5,200 MW of offshore wind by 2034 and 3,100 MW of storage by 2035.⁶⁹

State Regulations Protecting Customers

All states have mandatory or voluntary suspensions of utility shutoffs as of late April, with 10 more becoming mandatory in April compared to March.

- Alberta, along with four other Canadian provinces, have mandatory service moratoriums; an additional 5 territories have voluntary moratoriums

Utility Shutoff Regulations in Response to COVID-19 as of May 20⁷⁰



Regulatory Responses to COVID-19

Twenty one U.S. states and three Canadian provinces have implemented deferral payment provisions to support utilities' recovery of COVID-19 related costs, allowing utilities to defer them for future recovery.

There are 18 states with pending COVID-19 responses, all with proceedings underway to assess potential cost recovery solutions.

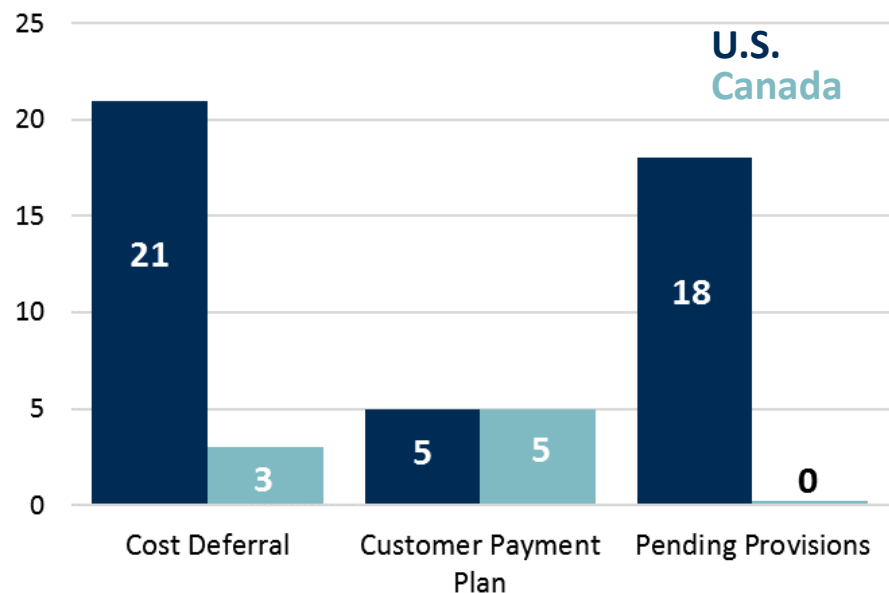
Regulatory assets to track or defer costs are the most common cost recovery provision passed by states, so far.

- Future proceedings will consider utility's request to recover these assets.

Five states* have clarified that customers are expected to fully repay their bill once the moratorium is lifted.⁷³

- Customers can set up payment plans to repay the full amount owed.

Decoupling Mechanisms Implemented⁷¹



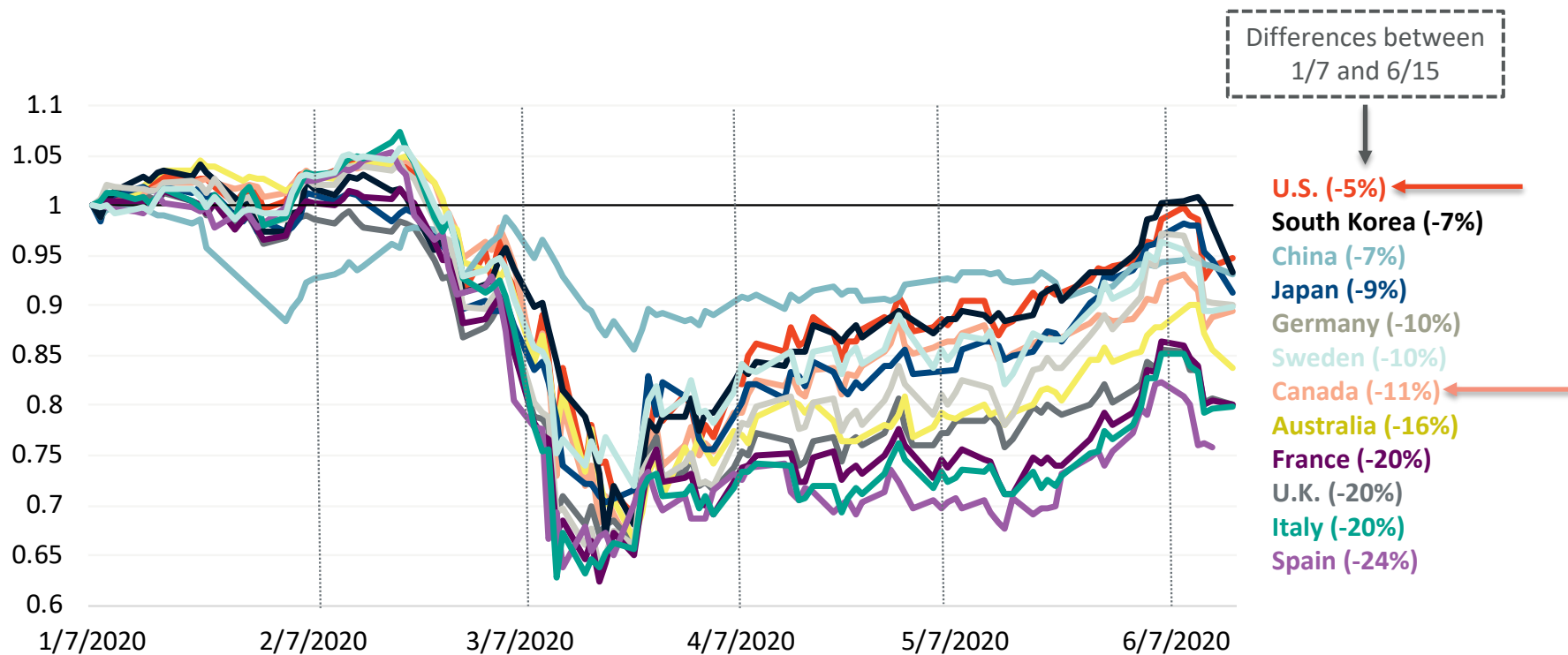
Note: Alberta has both cost deferral and customer payment plans in place.

* States include New Hampshire, North Carolina, Ohio, Texas, and Colorado.

Global Stock Prices

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

- *E.g.*, Asian countries have relatively smaller losses, compared to some in the E.U.
- The U.S. is an outlier with stock prices only a few percent below pre-pandemic levels.

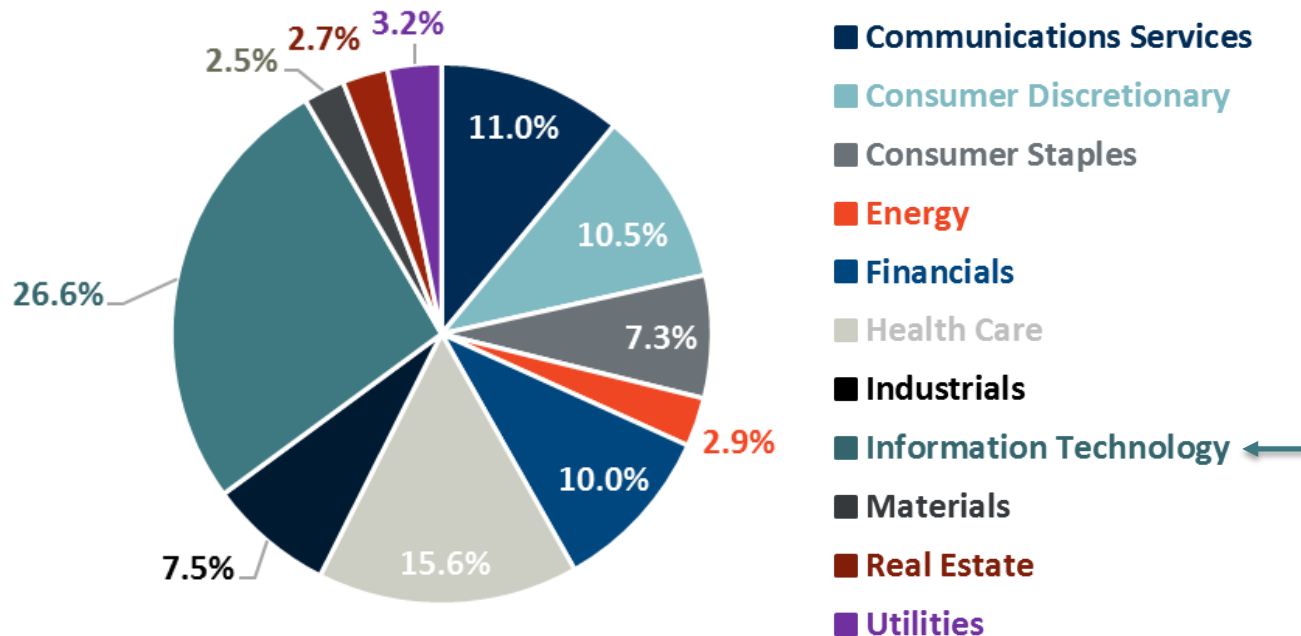


Industry Composition of S&P 500

The S&P 500 is comprised of primarily IT, health care, finance, and consumer companies.

- Energy and utilities account for slightly more than 6% of the total index.

Industry Composition of S&P 500



The large share of the U.S. index coming from high tech and IT partly explains its resilient stock market.

Other countries with more dependence on energy (especially oil), raw materials and exports, or tourism are likely to be harder hit by COVID.

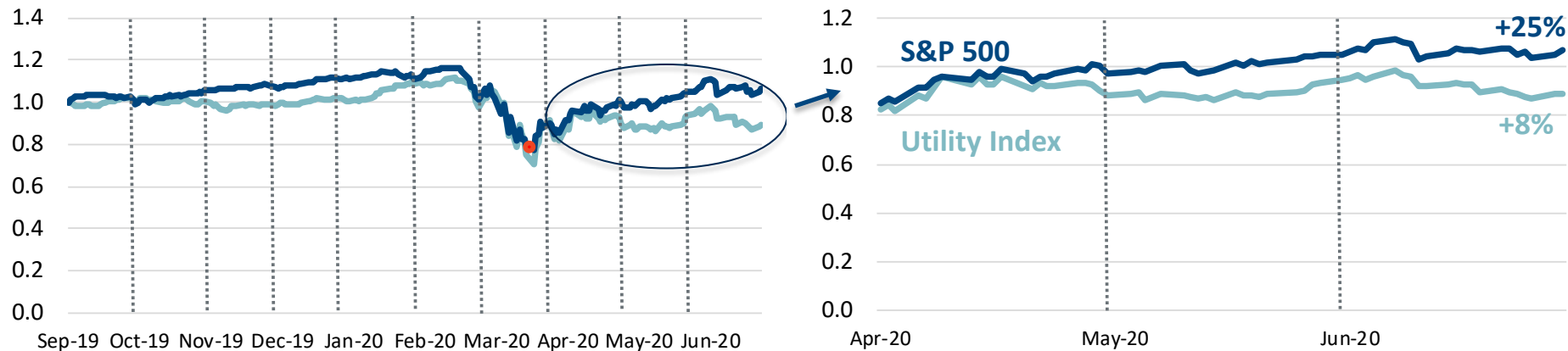
Financial Impacts — Utility Stock Prices

COVID impacts on the economy and uncertainty will affect utility cost of capital, liquidity, hedging, perhaps capex programs, and IRP expansion timing or choices.

Through the beginning of April, utility stock prices generally followed the overall market trends quite tightly, but more recently have been lagging behind the S&P 500.

- Since the beginning of April, the utility index price has gained only 8%, while the S&P improved 25% by June 30 -- despite utilities having less reported difficulty hitting earnings targets and offering attractive, nearly fixed dividends
- May suggest some investors question utilities' ability to recover lost revenues.

Historical Stock Prices



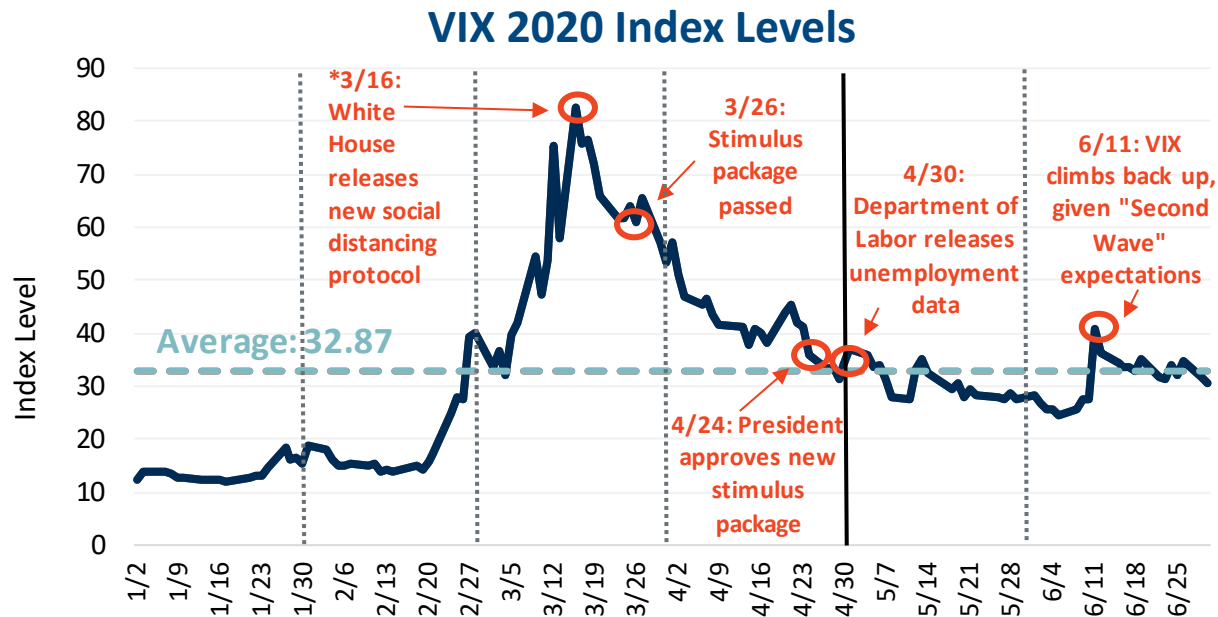
Note: S&P Utility Index includes electric, gas, and water utilities.

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

Market Volatility

Volatility has steadily declined from its peak of 82.69 in mid-March, but remains elevated at about the same average as in the Great Financial Crisis of 2008-09.

- 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 Jun-20
VIX Index Average	25.4	14.9	35.1	22.7	14.9	57.7	41.5	30.9	31.1
Utilities as % of S&P 500	3.8%	3.1%	4.4%	3.5%	3.4%	3.6%	3.3%	3.2%	3.1%

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

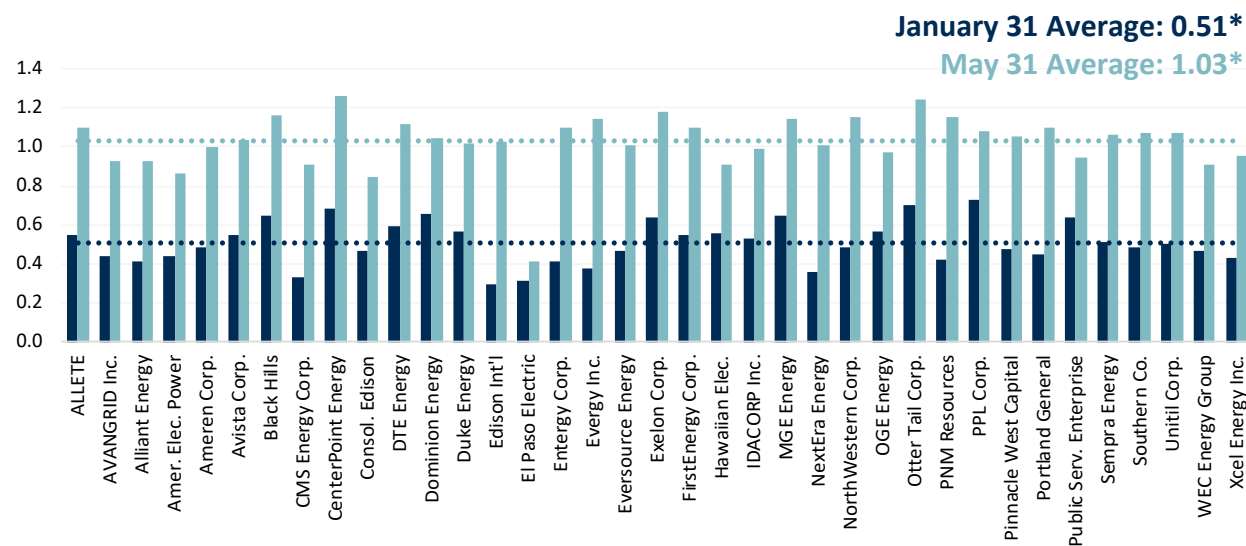
Source: Bloomberg, data as of April 30, 2020.

Electric Utility Betas

Four-month daily betas have increased across U.S. electric, gas and water utilities from January 31 to May 31, more than double their end-of-2019 average.

- Similar increases in utility betas occurred during the Global Financial Crisis.
- These increases in beta would call for 300-400 bps increase in ROE under CAPM.

Electric Utility 4-Month Daily Betas



Utility 4-Month Daily Beta Averages

	January 31	May 31	Difference	Impact on ROE (Assumed 8% MRP)
Electric	0.51	1.03	0.52	+4.1%
Gas	0.55	1.11	0.55	+4.4%
Water	0.59	1.01	0.42	+3.3%

It is possible these changes are transitory, but there are structural reasons to expect them to persist, esp. utility funded moratoriums on shutting off delinquent accounts, and increased utility exposure to macro recovery of the commercial sectors of the economy.

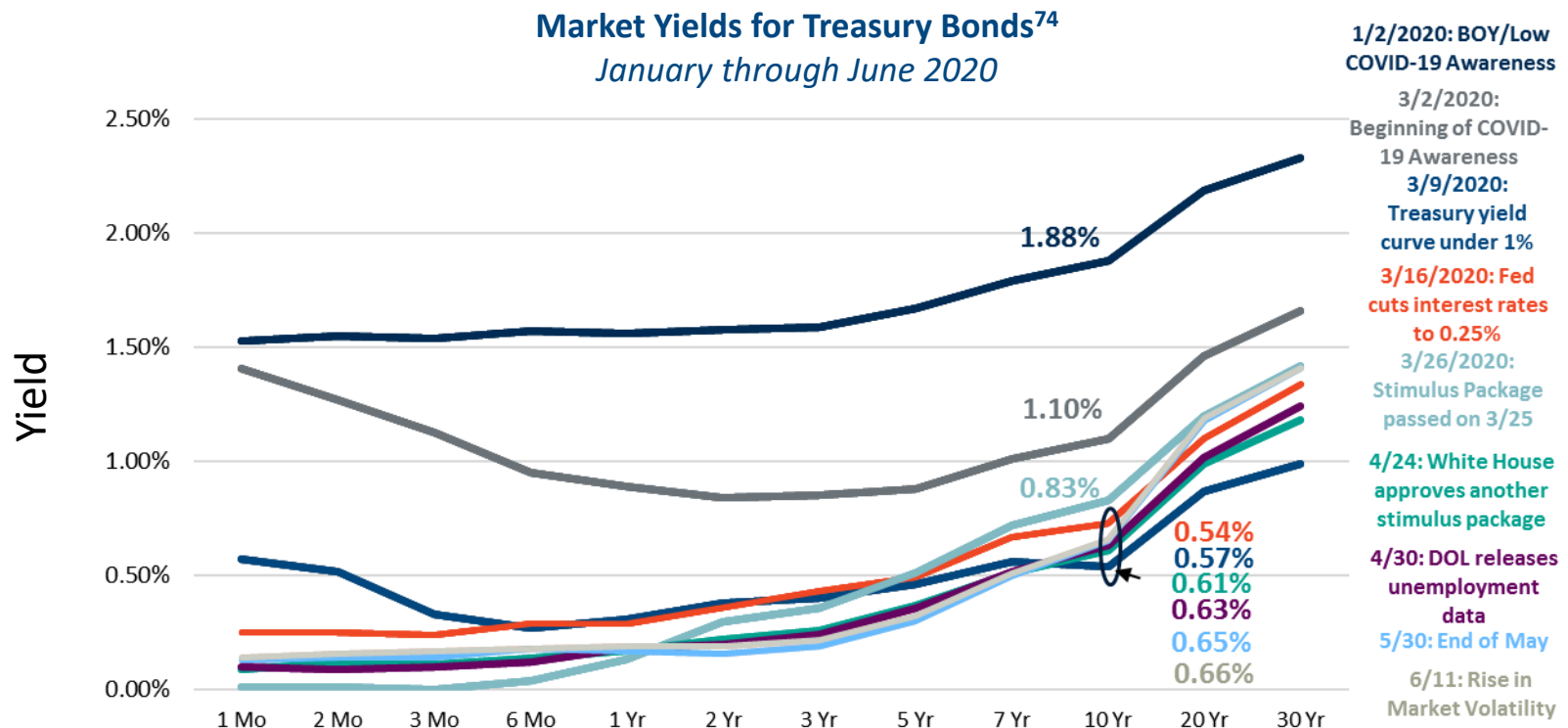
Source: Bloomberg, data as of May 31, 2020.

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

Treasury Yields

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

- 10-year yields in April hit 0.64%, only 10 basis points above the March low of 0.54%.



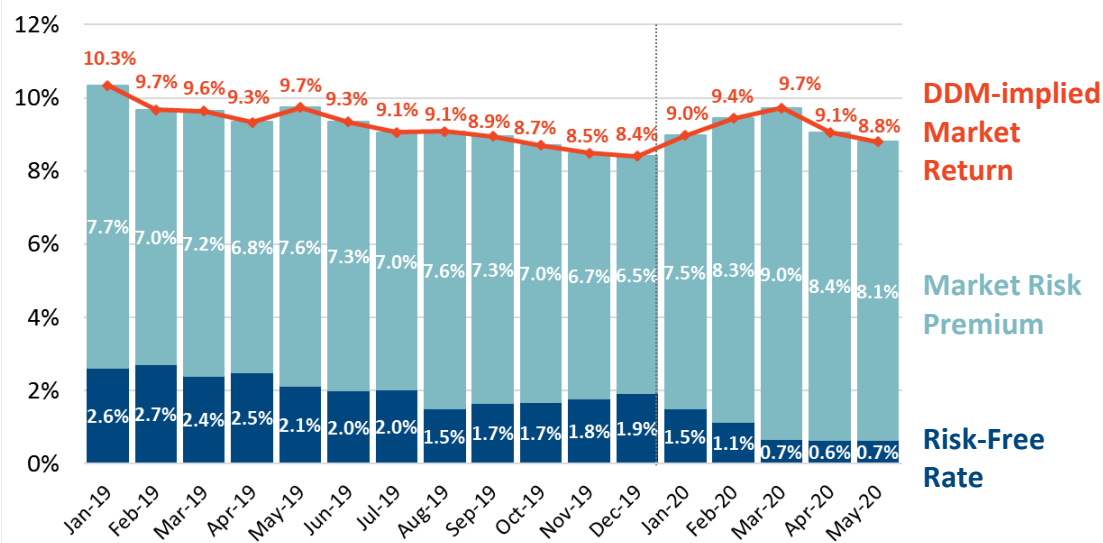
U.S. Required Returns

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

But the composition is very 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 June 18, 2020.

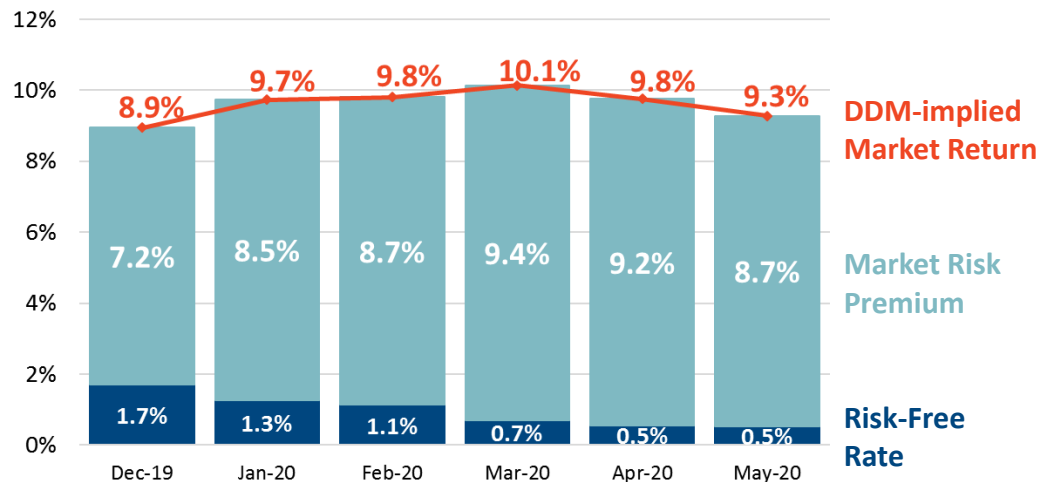
Notes: Market return estimated by Bloomberg with a forward-looking Dividend Discount Model. Risk-free rate is based on 10-year U.S. Treasury yield. Return based at approximately 70% equity capital structure.

Canada

Canadian stocks have experienced some of the highest volatility in its market, and is down around 11% since the beginning of 2020.

- Canada's social distancing policy varies across the country, but began generally around March 12 with gathering restrictions but limited Provincial lockdowns.⁷
- Canada's index is comprised of primarily materials and industrials companies, but the index has significantly more energy & utility companies than the U.S., with more than 20% of the overall index made up of energy & utility.
- This may make it more sensitive (indirectly) to COVID than its low infection levels would suggest.

Expected Canadian Market Returns



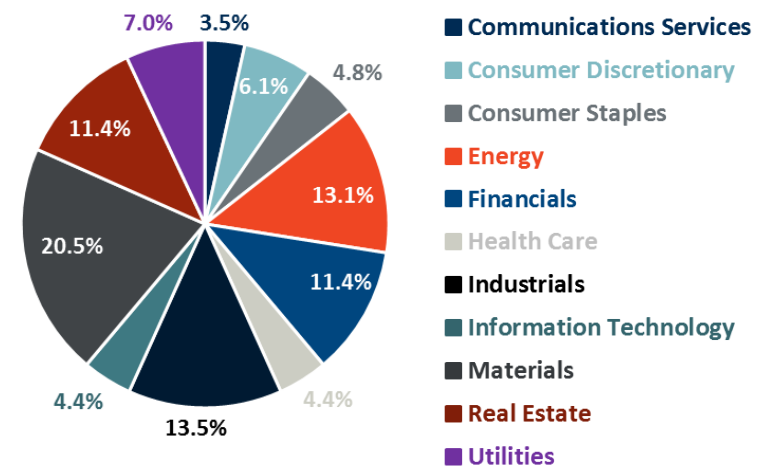
Source: Bloomberg, data as of June 18, 2020.

Note: Market return estimated by Bloomberg with a forward-looking Dividend Discount Model. Risk-free rate is based on 10-year Bank of Canada Treasury yield.

Summary Statistics ^{75,76,77}

Canada	
Death Rates per 100K People (as of June 18, 2020)	23
Lock Down Date (Dates may vary based on geography)	3/12
YoY Decline in GDP (as of April 2020)	-6.2%
Total Decline in Stock Price (January 7 - June 15)	-10.5%
YoY Change in Govt Bond Yield (since June 14, 2019)	-0.9%
YoY Change in MRP (since June 14, 2019)	1.3%

S&P/TSX Composite Index



229 Members

Credit Rating Agency Actions

On April 2, S&P Global Ratings downgraded the outlook for North American investor-owned utilities from “stable” to “negative” due to COVID-19 risk.⁷⁸

S&P Credit Downgrades in March- June 2020

Company	Date	Downgrade
PNM Resources, Inc.	4/6/2020	Action: Downgrade from "BBB+" to "BBB"
Texas-New Mexico Power Company	4/6/2020	Action: Downgrade from "A-" to "BBB+"
ALLETE	4/22/2020	Action: Downgrade from "BBB+" to "BBB"

Since the beginning of March, S&P has downgraded only 3 electric utilities -- for inadequate coverage ratios compounded by the uncertainty and liquidity risks from the pandemic. ⁷⁹

On April 22, Moody’s affirmed “stable” outlook for the U.S. public power sector, but cautioned that public power companies will likely have restricted liquidity and lessened coverage ratios for the next two years.⁸⁰

Canada has been recently downgraded by Fitch Ratings from AAA to AA+ due to “expanded general government deficit” and expectations of “higher public debt ratios”.⁸¹

3. Key Takeaways

A Worrisome Resurgence of U.S. COVID-19

U.S. policies of social distancing helped to “flatten the curve” by May, relative to hospital capacities, but relaxation of those controls has allowed a resurgence

- Now, COVID may not be amenable to ready control with testing, incremental quarantining and contact tracing.
- This will impair the ability to reopen the economy.

Various forecasts show a 2020 year over year GDP loss of around 4-7%, with a rebound to around +5-6% in 2021

- But the CBO forecasts that unemployment rates will remain elevated for many years to come
- Millions of Americans are delaying credit payments, which may be a harbinger of further revenue losses or difficulties with deferred cost recoveries for utilities

Oil and Gas may affect Canada

The direct effects of COVID may be not as important to the Canadian economy as the impact of the pandemic on oil, gas, and natural resource (export) markets.

- Oil futures for 2020-2026 are reflecting a long disruption to the demand and prices—not reaching pre-COVID levels of even \$50/bbl until 2026-2028.
- Natural gas demand and prices have remained fairly consistent with normal seasonal declines, showing no strong or obvious COVID-19 effects.
 - Spot prices have been relatively flat and forwards only depressed in front months, mostly due to oil and associated gas.
 - But worldwide, LNG netback spot prices to Asia and Europe are below Henry Hub spot prices for gas, causing an estimated 20 US LNG cargoes for June to be cancelled, and more for July and August. This is equivalent to 5-10% of US demand.

Electricity loads returning to normal

- The drop in average electric loads due to COVID seems to have peaked in April and May, and in June is now about 3% below normal (past average) levels.
- Forward prices for 2021 and beyond are mostly a bit above pre-COVID levels
- Residential load is estimated to be up about 8% so the overall load reduction is concentrated in C&I customers, which would have to have declined about 10-15% due to COVID-19 to explain the overall reduction.
- Month on month average ISO load shapes show only modest overall changes – slightly lower, but not materially altered, except for CA, which has a flatter and higher mid-day and sharper evening ramp. Specific peaks (not monthly averages) may have greater reductions, per ISO reports.
- Coal production fell to less than 20% of U.S. generation in the first part of 2020, and may decline by 20-25% this year.

Utility Risks Elevated

- Initial utility revenue reductions should be smaller in percentage terms than load losses, because the residential increases produce corresponding revenue increases (under volumetric rates) while the much larger lost C&I load is partly softened in revenues by demand charges.
- But the losses from moratoriums on shutoffs for non-payment may grow to levels difficult to recover, and some businesses may not be viable at reduced traffic, so very significant cost recovery shortfalls could arise despite notional deferral and decoupling mechanisms.
- It is likely that the cost of equity for utilities is up, due to these heightened cost recovery risks, reduced and more economy-sensitive growth, and altered market risk characteristics:
 - The US Market Volatility Index (VIX) is elevated to about the average level seen in the 2008/09 Great Financial Crisis, causing the Market Risk Premium to be up considerably.
 - Utility stock volatility has been more correlated with, and actually larger than, the US market as a whole, causing betas to go up.

Prepared By



Frank Graves
Principal, Boston

Frank is a Principal and co-founder of The Brattle Group with expertise in most aspects of long term utility planning, ratemaking and finance. Recently he has focused on financial and operating implications for utilities, their customers, and energy markets of heightened use of distributed energy resources and strong decarbonization goals, as well as resiliency to extreme “black swan” events.



Bob Mudge
Principal, Wash. D.C.

Mr. Mudge consults on matters concerning utility financial restructuring, credit requirements, rate design, valuation, and cost of capital. He has provided expert testimony before federal and state courts, utility and environmental regulators in the U.S. and Canada, and multiple arbitration venues. Recently, Mr. Mudge was a co-author of Brattle “white papers” on the financial implications of wildfires for California utilities.



Josh Figueroa
Associate, Boston

Josh is an Associate at Brattle focused on economic and financial topics in the energy sector with expertise in energy markets, infrastructure development, and mergers & acquisitions. Prior to joining Brattle, Mr. Figueroa worked for Con Edison Transmission leading acquisition and development of electric and natural gas transmission assets. Mr. Figueroa has an MBA from NYU’s Stern School of Business.



Tess Counts
Research Analyst, Boston

Tess is a Research Analyst with a focus on utility financial analysis, cost of capital, and resiliency. She has expertise in Brattle’s system dynamics models of long term electric distribution opportunities and risks, as well as in distressed asset valuations and California wildfire risk assessment. Her background is in economics from Wesleyan University.

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