



# Michigan Energy Appraisal

## Summer Outlook 2021

In compliance with MCL 460.6r

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## Preface

The Michigan Energy Appraisal is a semiannual assessment of Michigan’s energy baseline. The assessment raises the situational awareness of the state’s energy environment including recent events impacting supply and prices, expected conditions, and changes over the next six months. Additionally, it provides the necessary information to enable a reliable assessment of the risk posed by an energy supply disruption.

The novel Coronavirus (COVID-19) has had, and will continue to have, significant effects on Michigan’s energy landscape for the foreseeable future. COVID-19 has changed consumption levels and usage patterns of energy products throughout the state and has tested the resilience of Michigan’s energy systems. Past editions of the Michigan Energy Appraisal provided an insightful short-term outlook on the Energy Security Section’s expectations for energy supply and demand dynamics. However, like the Winter 2020/21 Energy Appraisal, this year’s Summer 2021 version will instead be a special edition highlighting the impacts of COVID-19, as well as the uncertainties for Michigan’s energy system going forward. This is for several reasons: the time lag on available data to accurately quantify the effects on energy demand; the impact of policy decisions to protect the well-being of the public; and uncertainty surrounding the duration of the impacts of COVID-19. These factors make projecting future energy supply and demand extremely speculative; therefore, a discussion on both known and potential impacts is a more valuable analysis.

In addition, the recent cyberattack that disrupted the flow of gasoline and jet fuel on the Colonial Pipeline highlights the ever-increasing importance of cybersecurity for critical energy infrastructure. As such, this Summer 2021 Energy Appraisal also offers additional information on the impacts to Michigan supplies and prices resulting from the Colonial ransomware attack, as well as reviewing the Commission’s recent activities involving cybersecurity, including an update on the progress in implementing the recommendations and observations relating to cyber and physical security contained in the 2019 Statewide Energy Assessment.

This report is prepared by the Energy Security Section of the Michigan Public Service Commission (MPSC) with assistance from the Energy Operations, Energy Resources, and Regulated Energy Divisions of the MPSC, Department of Licensing and Regulatory Affairs (LARA), State of Michigan.

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The Summer 2021 Energy Appraisal is available on the MPSC [website](#). A major source of data and analysis used in the appraisal is the federal Energy Information Administration (EIA) at <http://www.eia.doe.gov>. The EIA collects national, state, and international data on energy usage, prices, supply, etc., and provides expert analysis on trends in energy.

Comments or questions on this appraisal are welcomed and may be directed to Alex Morese, Michigan Public Service Commission, at [moresea@michigan.gov](mailto:moresea@michigan.gov). If you would like to receive the biannual Michigan Energy Appraisal via email, subscribe to the [listserv](#).

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## Executive Summary

On March 10, 2020, Governor Whitmer, the Michigan Department of Health and Human Services, Oakland County Health Division, and Wayne County Health Department announced the first presumptive cases of Coronavirus (COVID-19) in Michigan. One day later, on March 11, 2020, the World Health Organization (WHO) declared COVID-19 a global pandemic, halting travel and encouraging efforts to limit the transmission of COVID-19 around the world. On March 23, 2020 Governor Whitmer issued Executive Order 2020-21 (Stay Home Stay Safe)<sup>1</sup> to help halt the spread of COVID-19 and protect Michigan citizens. Executive Order 2020-21 resulted in a significant curb to expected economic activity as Michigan hunkered down to halt the spread of the virus.

Just over a year later, COVID-19 still presents a risk to residents in the state and across the country. Statewide, over 875,000 confirmed cases of the virus have been documented as of this publication, and COVID-19 has claimed the lives of more than 18,000 Michiganders. However, with the introduction of vaccines into the community there has been positive signs of movement back to near normal. Energy use in Michigan is closely tied to economic activity within the state. Motorists use gasoline to travel to and from work, companies move goods throughout the state by trucks and trains powered by diesel fuel, the industrial sector uses natural gas as a fuel for their manufacturing processes, and all sectors use electricity to light either their homes, businesses, or factories.

Even as Michiganders are increasingly returning to normal under the provisions of Governor Whitmer's "Vacc to Normal" plan, the cyberattack on the Colonial Pipeline providing gasoline for much of the East Coast served as a reminder of the ever-growing importance of cybersecurity. Throughout the disruption, Michigan did not experience any gasoline shortages (as MPSC Staff's Energy Security Section closely monitored the situation). We are also continuing to monitor price impacts, particularly as gasoline prices typically increase this time of year as we head into the Memorial Day weekend and the beginning of the summer driving season.

The core analyses in this summer's edition of the Michigan Energy Appraisal were compiled by Staff at the Michigan Public Service Commission and projections sourced from the federal Energy Information Administration.

Some key report findings for Michigan energy sectors:

- Demand for **motor gasoline** in 2020 declined for the second consecutive year, falling 15.2 percent to 3.9 billion gallons. The Energy Information Administration expects Midwest gasoline prices to average \$2.56 in 2021, 51 cents higher than in 2020.
- An estimated 4.24 million barrels of **crude oil** were produced in 2020, down from 5.1 million barrels in 2019. Prices for Michigan sweet and sour crude oil averaged about \$33/barrel and \$28/barrel in 2020, respectively.
- Total **electricity sales** in Michigan declined 5 percent in 2020. Declines were led by the industrial and commercial sectors, while residential sales increased by 6.6 percent as the work-from-home trend took hold. Projections from NOAA's Climate Prediction Center

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<sup>1</sup> Executive Order 2020-21: [https://www.michigan.gov/whitmer/0,9309,7-387-90499\\_90705-522626--00.html](https://www.michigan.gov/whitmer/0,9309,7-387-90499_90705-522626--00.html)

point towards an 8 percent warmer than normal summer for 2021, which could lead to increased electricity demand.

- The industrial sector was expected to have the most significant decline in consumption of **natural gas** due to COVID-19 slowing economic activity. Demand from the residential sector decreased by 6 percent in 2020. Electric power sector demand for natural gas has been trending upwards and may continue to do so if warmer-than-normal summer temperatures are experienced, as expected.
- Demand for **distillates**, the vast majority of which is diesel fuel, totaled 1.17 billion gallons in 2020, comparable to 2019 levels. Distillate demand in 2020 was not affected to the same extent as motor gasoline, as the fuel was still needed to move around much needed supplies and goods.

## Glossary

Barrel	A unit of volume equal to 42 U.S. gallons.
b/d	The abbreviation for barrel(s) per day, also displayed as bbl/d.
Bcf	The abbreviation for billion cubic feet.
Brent	A major trading classification of sweet light crude oil that serves as a major benchmark price for purchases of oil worldwide.
CDD	Cooling Degree Days - a measure of how warm a location is over a period of time relative to a base temperature, most commonly specified as 65 degrees Fahrenheit. Cooling degree days are used in energy analysis as an indicator of air conditioning energy requirements or use.
EIA	Energy Information Administration - the statistical and analytical agency within the U.S. Department of Energy.
GWh	One billion watthours.
GCR	Gas Cost Recovery - the actual cost of natural gas that a local distribution company pays to purchase natural gas for your use.
HDD	Heating Degree Days - a measurement designed to quantify the demand for energy needed to heat a building. A measure of how cold a location is over a period of time relative to a base temperature, most commonly specified as 65 degrees Fahrenheit.
LSE	Load serving entity - a cooperative, municipal, investor-owned utility, or an alternative electric supplier (AES) that provides electricity to its customers.
Mcf	One thousand cubic feet.
MISO	Midcontinent Independent System Operator –a regional transmission organization (RTO) that coordinates the movement of wholesale electricity in all or parts of 16 states and one Canadian province.
mmBtu	One million British thermal units.
MW	One million watts of electricity.
OECD	Organization for Economic Cooperation and Development - an intergovernmental economic organization with 35 member countries, founded in 1961 to stimulate economic progress and world trade.
OPEC	Organization of the Petroleum Exporting Countries
PJM	PJM – an RTO that coordinates the movement of wholesale electricity in all or parts of 13 states and the District of Columbia.
STEO	Short-Term Energy Outlook published monthly by EIA.
WTI	West Texas Intermediate (also known as Texas light sweet) – a grade of crude oil used as a benchmark in oil pricing.

## Trending Topics

### Enbridge Energy Public Act 16 Filing (Case No. U-20763)

On April 17, 2020, Enbridge Energy filed an application with the MPSC pursuant to Public Act 16 of 1929, MCL 483.1 et seq, also referred to as Act 16, requesting authority to replace and relocate the segment of Line 5 crossing the Straits of Mackinac into a tunnel beneath the Straits of Mackinac. The application seeks approval for Enbridge's project known as the Straits Line 5 Replacement Segment Project, which will replace the current crossing - consisting of two 20-inch diameter pipes (referred to as the Dual Pipelines) with a single 30-inch diameter pipe located within a concrete-lined tunnel below the lakebed of the Straits.

On January 29, 2021, the Department of Environment, Great Lakes, and Energy (EGLE) approved Enbridge Energy's application for certain permits required to build a utility tunnel under the Straits of Mackinac. The permit approvals followed a nine-month review period and covered Enbridge's National Pollutant Discharge Elimination System Wastewater Permit (NPDES), bottomlands, and wetlands permit applications. On April 21, 2021 the MPSC issued an order rejecting intervenors' arguments that the Commission must examine in this case whether there is a public need for the 641 miles of Line 5 not at issue in Enbridge's application. Further in the order, the Commission agreed with intervenors that the replacement pipe segment review must include an examination of the allegations of greenhouse gas pollution raised by intervenors under MEPA.<sup>2</sup>

### Colonial Pipeline Ransomware Attack

On May 7, 2021, operation of the Colonial Pipeline was interrupted as a result of a ransomware cyberattack. The Colonial Pipeline – a 5,500 mile long, 2.5 million b/d pipeline is a major delivery system for refined petroleum products (gasoline, diesel, and jet fuel) spanning from Houston, TX along the Gulf Coast and up the East Coast to Linden, NJ. Due to a lack of refinery operations along the Eastern seaboard, the Colonial Pipeline serves as a critical piece of infrastructure for the shipment of transportation fuels to the region. Markets along the pipeline route did experience supply shortages as motorists rushed to get what fuel they could. However, on May 13, 2021 the Colonial Pipeline Company announced that operations of the entire pipeline had been restarted and product was being delivered to all market points. It was expected that it would take several days to resupply markets of the much-needed fuel. During the nearly weeklong shutdown, average U.S. gasoline prices rose 7 cents/gallon according to AAA.

Michigan's supply of transportation fuels was not interrupted during the Colonial Pipeline shutdown. Michigan primarily relies on refined petroleum products from Marathon's Detroit Refinery as well as from refineries in the Chicago, IL and Toledo, OH markets. Although Michigan's supply was not interrupted, the situation did not go unnoticed and was closely monitored by MPSC staff. Included in this Summer Energy Appraisal is a special section highlighting the cybersecurity work the MPSC has undertaken and will continue to work on to ensure the safe and reliable delivery of energy products to consumers.

## Cybersecurity Risk and Preparedness

A key element of any analysis of energy supply, demand, and prices is contemplating how each of these components could be impacted by disruptive events. At no time was this more evident

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<sup>2</sup> MPSC April 21, 2021 Order in Case No. U-20763: <https://mi-psc.force.com/sfc/servlet.shepherd/version/download/068t000000MOSVDAA5>

than in 2020, when the COVID-19 pandemic upended energy markets and temporarily – if not permanently – changed how energy is produced, delivered, and consumed around the world.

While the COVID-19 pandemic stands as the most obvious disruptive event in recent years, it is by no means the only one. Energy officials across the country work tirelessly to minimize the potential impacts of hurricanes, wildfires, ice storms, deteriorating infrastructure, and other threats to typical energy operations. This month, we saw the manifestation of another such threat when a malicious cyberattack led to a six-day halting of the Colonial Pipeline and a shortage of petroleum products across a swath of the U.S. East Coast. In this edition of the Michigan Energy Appraisal, we take a closer look at cybersecurity risk, how private and public entities including the MPSC work to manage it, and what it all means in the context of Michigan’s energy environment.

Energy infrastructure, like the broader economy, increasingly leverages modern technologies to realize cost and operational efficiencies, enhance the collection and analysis of data, and enable new services and products. Smart grid infrastructure, for example, eliminates the need for in-person meter reading, provides better visibility into energy consumption patterns, and makes possible more granular rate structures such as time-of-use pricing. This advancement, however, is not without risks. The proliferation of “smart” devices across energy networks dramatically increases the number of network points that could be compromised in a cyberattack and the amount and types of data that could be exposed in a potential cybersecurity breach.

The good news is that extensive work is being conducted across the energy sector to manage this cyber risk. Since 2008, operators of the bulk electric system have been required to meet or exceed the North American Electric Reliability Corporation’s critical infrastructure protection (NERC CIP) standards to help protect against cyberattacks.<sup>3</sup> For natural gas and hazardous liquids pipeline systems, the Transportation Security Administration has produced several iterations of security guidance since 2002, although adherence to this guidance is voluntary.<sup>4</sup> In recent years, a wave of other frameworks, guidance documents, industry standards, and other resources have become available to help secure energy infrastructure and the operation thereof.

While the MPSC monitors these initiatives and participates in their development as appropriate, its core focus has been to identify gaps in the cybersecurity practices employed in Michigan’s energy sector and to use a variety of approaches to address these gaps and any other areas of unacceptable cyber risk. To that end, the MPSC has codified certain information sharing practices for investor-owned and cooperative utilities in Michigan, including requiring the reporting of specific types of cyber incidents to the MPSC and the Michigan Intelligence Operations Center and providing the MPSC with information about their cybersecurity preparedness on an annual basis. These requirements became effective in 2019 and 2020 for electric and natural gas utilities, respectively. Additionally, the 2019 *Statewide Energy Assessment* identified the need for, among other things, baseline cybersecurity standards for Michigan’s electric and natural gas distribution utilities.<sup>5</sup> In response, as of September 2020, investor-owned and cooperative natural gas utilities in Michigan must now adhere to American Petroleum Institute Standard 1164, which articulates

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<sup>3</sup> FERC Mandatory Reliability Standards Final Rule: [https://www.ferc.gov/sites/default/files/2020-05/E-2\\_52.pdf](https://www.ferc.gov/sites/default/files/2020-05/E-2_52.pdf)

<sup>4</sup> TSA Pipeline Security Guidelines: [https://www.tsa.gov/sites/default/files/pipeline\\_security\\_guidelines.pdf](https://www.tsa.gov/sites/default/files/pipeline_security_guidelines.pdf)

<sup>5</sup> MPSC Statewide Energy Assessment: [https://www.michigan.gov/documents/mpsc/2019-09-11\\_SEA\\_Final\\_Report\\_with\\_Appendices\\_665546\\_7.pdf](https://www.michigan.gov/documents/mpsc/2019-09-11_SEA_Final_Report_with_Appendices_665546_7.pdf)

specific practices to manage the integrity and security of pipeline SCADA systems.<sup>6</sup> MPSC staff is currently working with electric sector experts to develop baseline security standards for Michigan's electric distribution utilities, many of whom operate assets that are not subject to the NERC CIP requirements.<sup>7</sup> Lastly, we continue to collaborate with personnel across Michigan's energy subsectors to implement other recommendations from the *Statewide Energy Assessment* to enhance the security and resiliency of energy operations in the state.

Unfortunately, as with risks posed by hurricanes or wildfires, it is impossible to eliminate cyber risk entirely. While the Colonial Pipeline incident was unique in several respects, it was not the first nor will it be the last energy disruption caused by cyber means. Accordingly, in conjunction with the implementation of various controls and procedures designed to thwart potential cyber disruptions, public and private sector energy stakeholders work equally hard preparing for a time in which these protections fail. Such activities include developing cyber incident response plans, conducting drills and exercises to test response capabilities, and forging agreements ahead of time with external parties who can provide technical and legal expertise in the event of a cybersecurity incident.

As the risk from ransomware and other cyber threats increases, there are concrete signs that public and private energy sector stakeholders are rising to the occasion. Grid Ex, the country's premier electric grid security exercise, has grown from 75 participating organizations in 2011 to more than 500 in 2019.<sup>8</sup> Utilities across Michigan have added additional security personnel, formed enterprise-wide security programs, and invested in technologies to better prevent, detect, and respond to cybersecurity disruptions. Cybersecurity information sharing among industry and the government is improving, with registered users of the information sharing portal E-ISAC growing 40% in 2020.<sup>9</sup> As we continue to move forward into an exciting technical future, the MPSC will continue its work in promoting resilience against energy disruptions, monitoring the market impacts when energy disruptions occur, and sharing this information with stakeholders through efforts like this Michigan Energy Appraisal.

## Motor Fuels

### Demand

Gasoline demand in Michigan totaled 3.9 billion gallons for 2020, a decrease of 15.2% from 2019 and a second consecutive annual decline. This sizeable decline in gasoline demand can, in large part, be attributed to the effect COVID-19 has had on the economy. In the early stages of the pandemic, state-wide restrictions led to significant reductions in travel as Michigan residents were directed to remain at home or in their place of residence to the maximum extent possible. It is expected that gasoline demand will rebound for 2021 with the easing of restrictions and the

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<sup>6</sup> Gas Service Technical Standards:

<https://ars.apps.lara.state.mi.us/AdminCode/DownloadAdminCodeFile?FileName=R%20460.2301%20to%20R%20460.2384.pdf>

<sup>7</sup> MPSC Grid Security and Reliability Standards: [https://www.michigan.gov/mpsc/0,9535,7-395-93307\\_93312\\_93593\\_95590\\_95596\\_95597-508672--,00.html](https://www.michigan.gov/mpsc/0,9535,7-395-93307_93312_93593_95590_95596_95597-508672--,00.html)

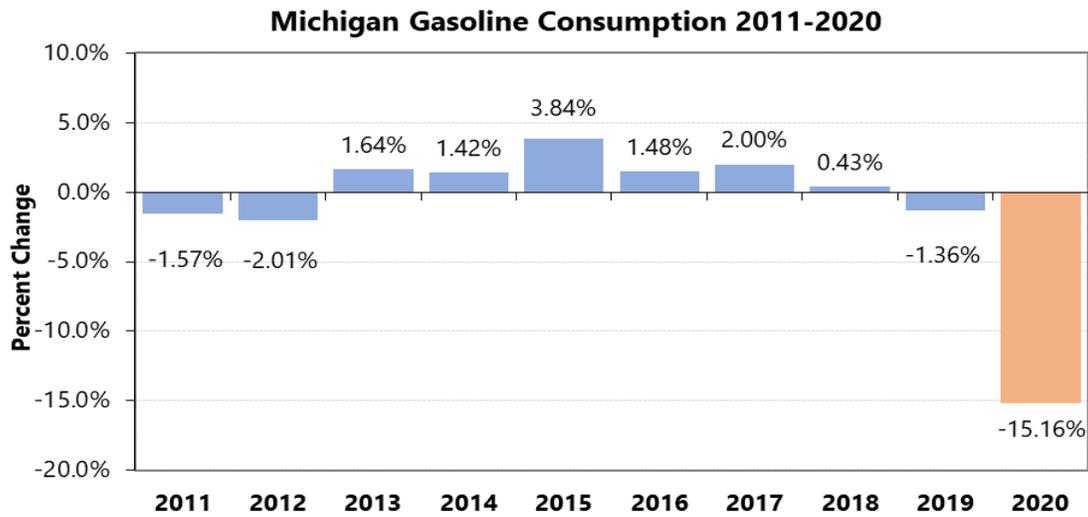
<sup>8</sup> Grid Ex V Lessons Learned Report:

<https://www.nerc.com/pa/CI/ESISAC/GridEx/GridEx%20V%20Public%20Report.pdf>

<sup>9</sup> NERC 2020 Annual Report:

[https://www.nerc.com/gov/Annual%20Reports/NERC\\_Annual%20Report\\_2020.pdf](https://www.nerc.com/gov/Annual%20Reports/NERC_Annual%20Report_2020.pdf)

introduction of COVID-19 vaccinations into the general populous. However, the extent of the rebound will likely depend upon future infection rates and the comfort level of consumers with traveling and the potential for exposure to the virus.



Source: Energy Information Administration

Total distillate (primarily diesel fuel) demand for 2020 was 1.17 billion gallons, down only slightly from 2019 at 1.19 billion gallons. Like motor gasoline, distillate demand was likely negatively affected by COVID-19, although the extent of the decline was not nearly as severe. Ultra-low sulfur diesel fuel accounted for approximately 98% of total distillate demand in 2020, a majority being used for transportation by highway trucks. Other users of distillates, although less prominent, include the agriculture, commercial, and industrial sectors, as well as vessel fueling. Due to the various uses of diesel fuel and the need to transport consumer goods and supplies to combat the COVID-19 pandemic, demand for the fuel did not experience the same degree of decline as seen with motor gasoline.

The estimated all vehicle real-world fuel economy for the 2020 model year was 25.7 miles per gallon, an improvement from the 24.9 miles per gallon average in 2019. Vehicle fuel efficiencies are at an all-time high, increasing by 29% between 2005 and 2019 according to the Environmental Protection Agency’s Automotive Trends Report.<sup>10</sup>

### Supply

Michigan experienced an abnormal motor gasoline supply situation entering last summer’s driving season. As demand for motor fuels slowed, petroleum terminals were left with an abundance of winter-grade gasoline that would not meet the standards of Michigan’s Motor Fuels Quality Act or federal fuel volatility regulations outlined in 40 CFR 80.27. Michigan’s Motor Fuels Quality Act of 1984 requires the sale of lower Reid Vapor Pressure (RVP) gasoline at retail locations between June 1 and September 15 in order to maintain air quality standards and reduce the

<sup>10</sup> EPA Automotive Trends Report: <https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P1010U68.pdf>

amount of volatile organic compounds in the atmosphere.<sup>11</sup> Executive Orders 2020-31<sup>12</sup> and 2020-102<sup>13</sup> were issued during this period which suspended gasoline RVP requirements in order to allow terminals to distribute remaining winter-grade fuel to make adequate space to receive compliant summer-grade fuel. No similar gasoline supply issues are expected entering this summer's driving season as demand rebounds back closer to historical levels and marketers have been able to transition to the appropriate grades of gasoline.

For the week ending May 14, 2021, 1.08 million barrels per day of gasoline were imported into the U.S. compared to just 526 thousand barrels per day for the comparable week in 2020, an increase of 105%. National gasoline inventories are currently near the bottom of the five-year range for this time of year. For the week ending May 14, U.S. total gasoline inventories stood at 234 million barrels (26.2 days of supply), down 21.5 million barrels from the same time last year. Midwest inventories were at 45.6 million barrels, 9.2 million barrels lower than last year. Lower year-over-year inventory levels are a result of the impacts from COVID-19 last spring and the glut of motor gasoline that ensued due to residents across the country staying home. Additionally, the February 2021 polar vortex that hit the Midwest and Gulf Coast had a noticeable impact on refinery operations – with refinery utilization falling from a five-year average of 87.6% to 64.8% for the Gulf Coast during this month.

Midwest distillate stocks are lower than last year as well, standing at 26.7 million barrels for the week ending May 14, 2021. U.S. exports of distillate fuel oil have slowed when compared to the record 1.84 million barrels per day set in July of 2018, but still averaged 1.09 million barrels per day for the week ending May 14, 2021. U.S. distillate inventories are near the middle of the five-year range and were at 132 million barrels as of the week ending May 14, 2021, down from 159 million barrels a year ago.

Based on the most recent available data, the U.S. refinery utilization rate for the week ending May 14, 2021 was 86%, 18.4 percentage points higher than the comparable week of last year – a clear indication of the demand reduction COVID-19 had on the U.S. petroleum refining sector.

### Price

According to AAA Michigan, the average price for a gallon of regular unleaded gasoline in Michigan on May 19, 2021 was \$2.94, compared to \$1.85 a year ago. On-highway diesel prices for the same date were \$3.15, up \$0.70/gallon from a year ago. Higher year over year prices are a result of COVID-19 and the demand curtailment that had taken place in petroleum markets, with an additional increase likely attributable to the residual impacts of the Colonial Pipeline cyberattack. This conclusion is supported by the increase in the price of a gallon of regular unleaded gasoline that is \$0.16 higher than it was one month ago. Higher crude oil prices relative

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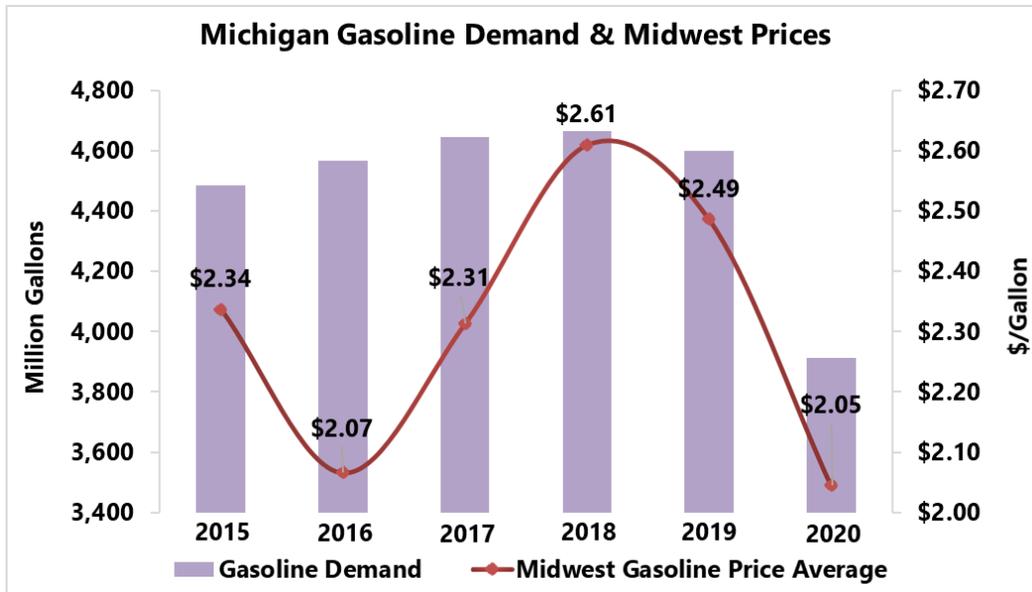
<sup>11</sup> Between June 1 and September 15, the Reid vapor pressure requirement is 9.0 psi for all Michigan counties, excluding Wayne, Livingston, Washtenaw, Oakland, Macomb, St. Clair, and Lenawee which have a 7.0 psi requirement. Note that 13.5 psi gasoline is required in all Michigan counties in March, April, September 16-30, and October. All counties for the months of November, December, January, February, and March have a 15.0 psi requirement.

**Michigan Motor Fuels Quality Regulations:** [https://www.michigan.gov/mdard/0,4610,7-125-1569\\_28953-272309--,00.html](https://www.michigan.gov/mdard/0,4610,7-125-1569_28953-272309--,00.html)

<sup>12</sup> [https://www.michigan.gov/whitmer/0,9309,7-387-90499\\_90705-523622--,00.html](https://www.michigan.gov/whitmer/0,9309,7-387-90499_90705-523622--,00.html)

<sup>13</sup> [https://www.michigan.gov/whitmer/0,9309,7-387-90499\\_90705-530034--,00.html](https://www.michigan.gov/whitmer/0,9309,7-387-90499_90705-530034--,00.html)

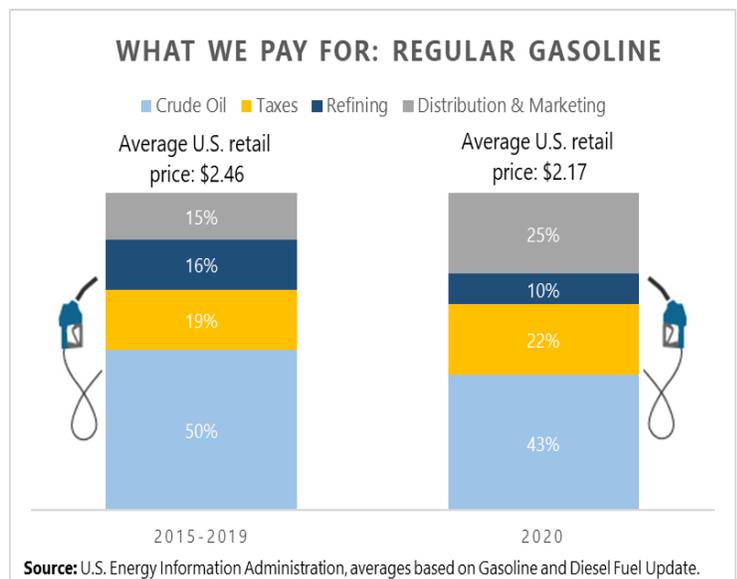
to last year are also a driving factor for higher prices seen at the pump. The EIA projects WTI crude oil to average \$58.91/barrel for 2021, compared to only \$39.17/barrel seen in 2020.



Source: Energy Information Administration

The EIA projects Midwest regular-grade gasoline prices to average \$2.71/gallon during the summer driving season (April-September), compared to \$1.92/gallon last summer. Midwest regular-grade gasoline prices are forecasted to average \$2.56/gallon for all of 2021.

The U.S. price of regular gasoline averaged \$2.18/gallon in 2020, 42 cents lower than in 2019, but is projected to return to \$2.68/gallon in 2021. U.S. on-highway diesel fuel retail prices, which averaged \$2.55/gallon in 2020, are projected by the EIA to average \$2.97/gallon for 2021. As we saw with the Colonial Pipeline cyberattack, unforeseen refinery outages, political unrest, adverse weather conditions, or any other disruption to supply could certainly have the potential to increase national product prices in the short term.



## Petroleum

### Michigan/Midwest Outlook

Michigan consumed an estimated 178 million barrels of petroleum products in 2019 (latest available data), the majority of which were motor fuels, such as gasoline and diesel fuel refined from crude oil. Michigan produces some crude oil in-state – about 4.24 million barrels in 2020, which ranked 18<sup>th</sup> of the 32 crude oil producing states. Lead crude oil producing counties include Jackson in southern Michigan and Otsego and Manistee in the northern Lower Peninsula. Despite in-state production, most of the petroleum consumed in Michigan is imported from neighboring

states and Western Canada. This supply arrives via interstate pipeline as both unrefined crude oil and refined petroleum products. The crude is transported to and refined in Southeast Michigan at the Marathon Refinery, which processes approximately 132,000 barrels of crude oil per day (b/d) into gasoline, diesel fuel, petroleum coke, and asphalt. Refineries in neighboring states such as Illinois and Ohio meet the remainder of Michigan’s petroleum needs; their products are imported via pipeline, rail, and truck.

**Top Ten Michigan Crude Oil Producing Counties, 2019**

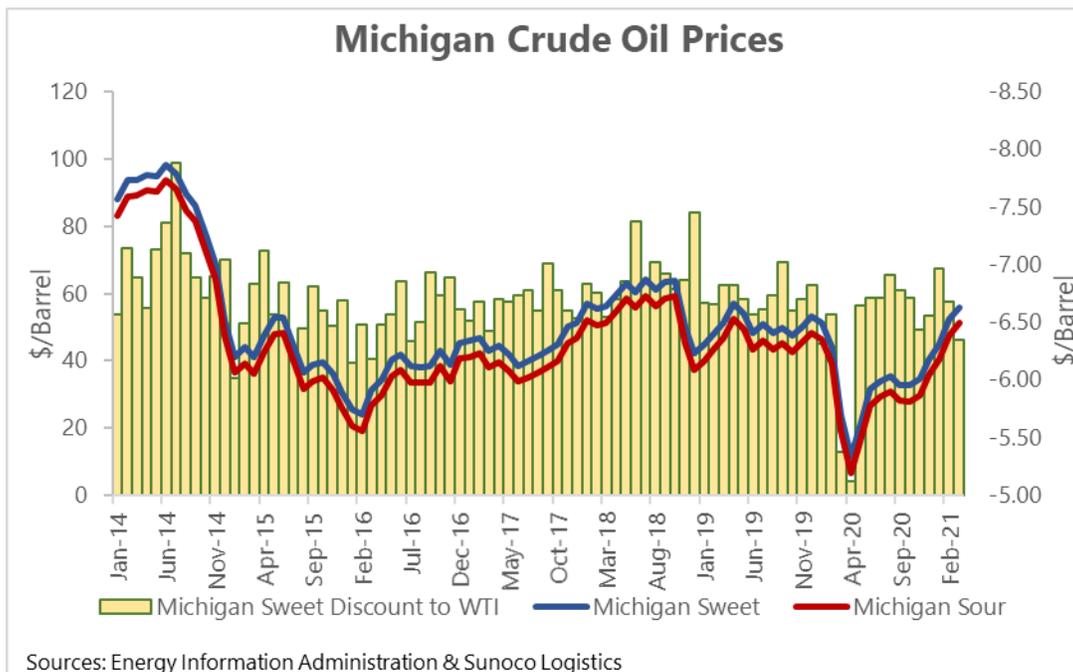
	<b>County</b>	<b>Barrels</b>
<b>1</b>	JACKSON	661,059
<b>2</b>	OTSEGO	402,874
<b>3</b>	MANISTEE	347,969
<b>4</b>	GLADWIN	260,899
<b>5</b>	BAY	238,588
<b>6</b>	KALAMAZOO	230,704
<b>7</b>	CLARE	220,678
<b>8</b>	GRAND TRAVERSE	185,486
<b>9</b>	WASHTENAW	183,116
<b>10</b>	CALHOUN	182,330

According to the EIA, Michigan had 48 million barrels of proven crude oil reserves at the end of 2019.<sup>14</sup> The amount of proven reserves fluctuates as new fields are discovered or adjustments are made as new reservoirs in existing fields are found. Michigan crude oil production has steadily declined since 1981, the first year of available data from the EIA. The 4.24 million barrels of production in 2020 is down from 5.1 million barrels the year prior as the price for crude oil remained depressed and producers were asked to reduce output. Crude oil stocks in the Midwest have remained fairly steady in recent weeks, reaching 134 million barrels on May 14, 2021, a 9% decrease over storage levels seen at this time last year.

The price received for crude oil produced in Michigan generally tracks well with the U.S. benchmark West Texas Intermediate (WTI). Over the past five years, Michigan sweet crude oil has sold at an average discount of \$6.65/barrel compared to WTI. Michigan sour blends of crude oil typically trade at a discount to sweet blends, with recent average discounts being approximately \$4.75/barrel. The EIA projects WTI crude oil to end in 2021 at \$56.50/barrel, which means Michigan crude oil producers might expect to receive \$50/barrel for sweet blends and \$45/barrel for sour blends, assuming historical discounts remain relatively stable. Prices at these levels may encourage Michigan producers to consider further exploration and development of additional wells, after a year of depressed prices in 2020.

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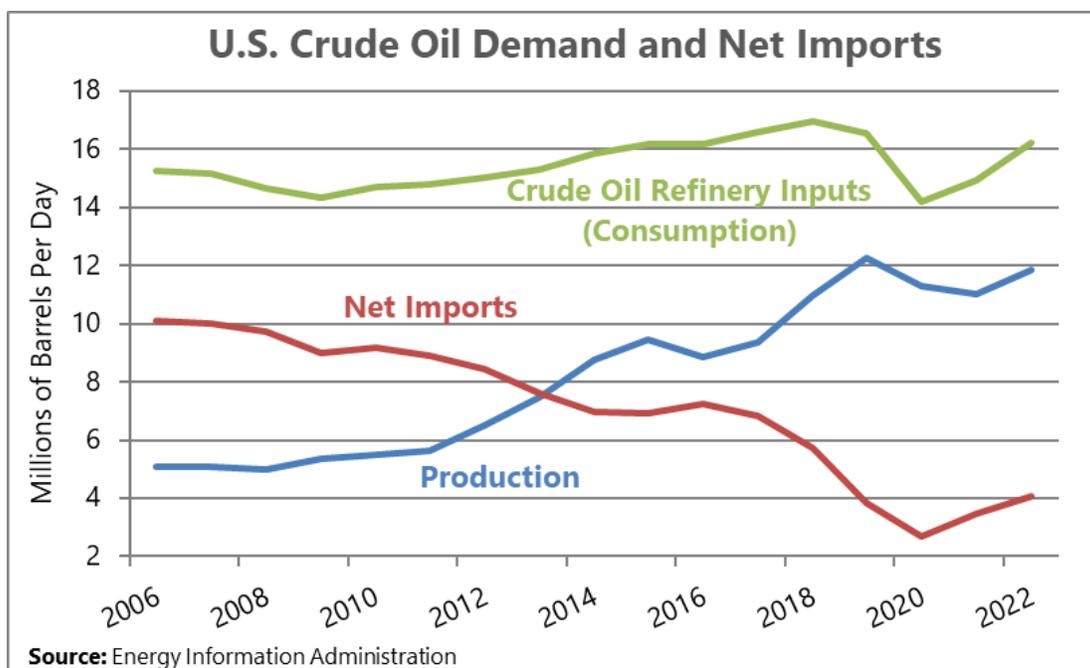
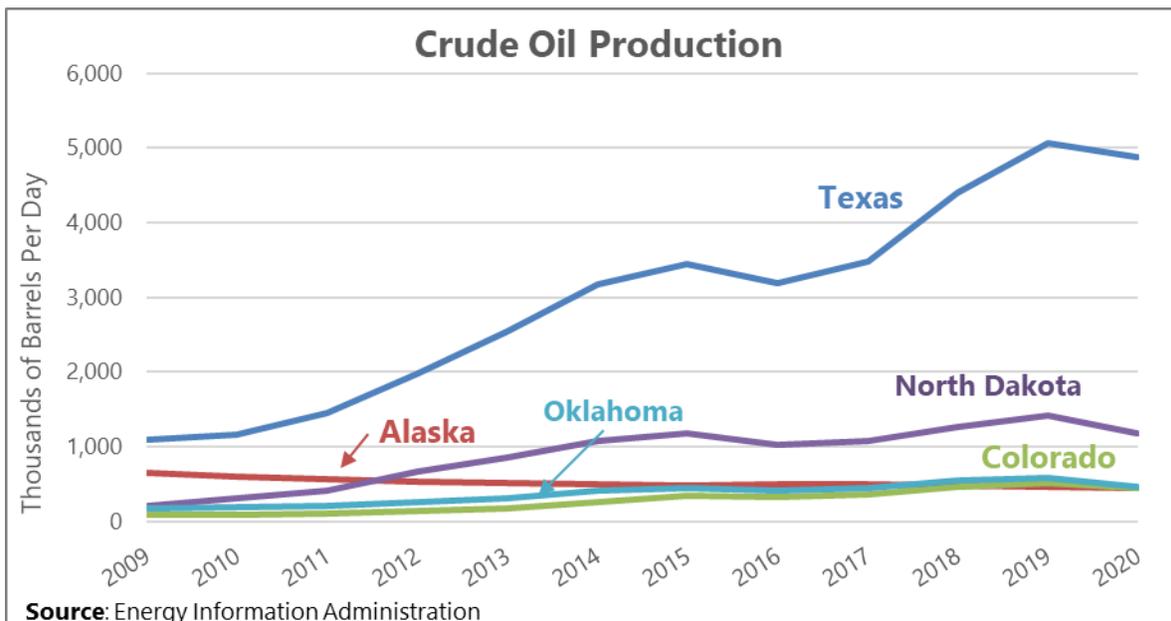
<sup>14</sup> Proved reserves of crude oil as of December 31 of the report year are the estimated quantities of all liquids defined as crude oil, which geological and engineering data demonstrate with reasonable certainty to be recoverable in future years from known reservoirs under existing economic and operating conditions. Source: *Energy Information Administration*



### U.S. Outlook

The EIA’s April Short Term Energy Outlook (STEO) revised U.S. crude oil production figures downward from just a month ago. U.S. crude oil production averaged 11.3 million b/d in 2020 and is expected to decrease to 11.04 million b/d for 2021 and up to 11.86 million b/d in 2022. The price for WTI began a steep decline in March of 2020 as petroleum demand weakened from the effects of COVID-19 and supplies of oil at large storage hubs increased. On April 20, 2020, the WTI front month futures contract traded at a negative value for the first time in history, trading as low as -\$40.32/barrel. The negative contract values were a result of limited crude oil storage space combined with the inability of traders to find market participants to sell their futures contracts to, avoiding the need to take physical delivery of the crude oil. Following this extreme price volatility in April, oil prices began to steadily rise for the remainder of 2020, ending the year at \$47/barrel for WTI. Prices continued this upward trend to begin 2021 and current WTI spot prices reside at \$66/barrel for WTI and \$69/barrel for Brent.

U.S. crude oil stocks currently reside 40.5 million barrels lower than a year ago, when stocks built to near record highs as the effects of COVID-19 set in. As of May 14, 2021, the U.S. had 486 million barrels in inventory (8% decline relative to 2020) which still stands near the middle of the five-year range for this time of year. U.S. crude oil exports – although not at record levels, remain relatively strong with the four-week average ending May 14, 2021 standing at 2.9 million barrels per day.



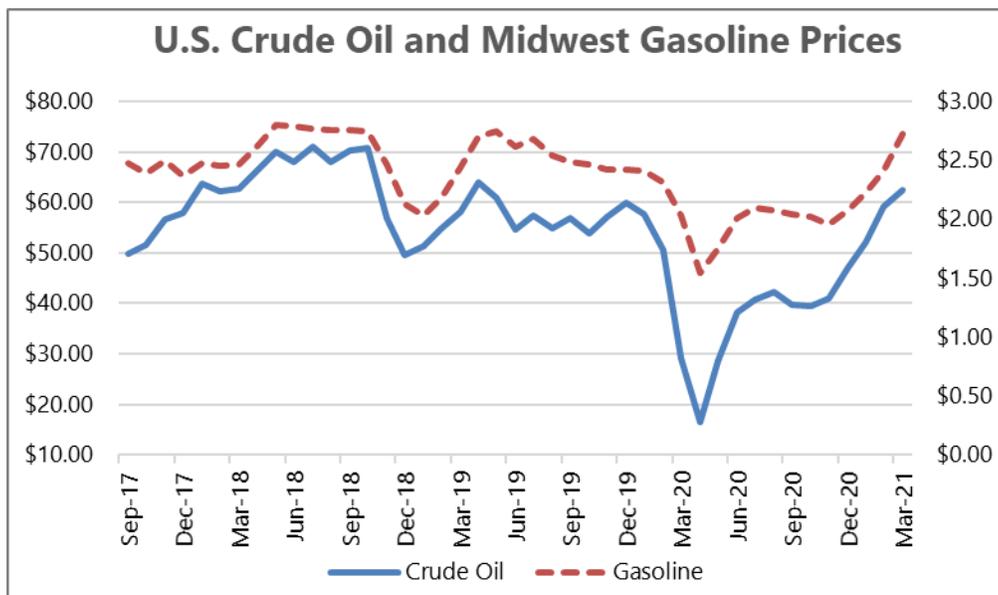
## World Outlook

The EIA May STEO reports that global petroleum consumption will increase by 5.4 million b/d in 2021 and again rise by 3.73 million b/d in 2022. The increase for 2021 is attributed to both non-Organization for Economic Cooperation and Development (OECD) nations, as well as more developed regions, as global travel and economies return to near normal levels following the COVID-19 pandemic.

Global petroleum production and supply is expected to rise by 2.4 million b/d in 2021 and further grow 4.4 million b/d in 2022. The 2021 consumption and production projections demonstrate why increased oil prices are expected for the current year. When global consumption growth outpaces production, the result will be a decline in global crude oil inventories and subsequent strengthening in prices. In early April, the Organization of Petroleum Exporting Countries (OPEC) and non-member Russia announced they would begin easing production curtailments in May.

However, Saudi Arabia indicated they would be easing their voluntary 1 million b/d curtailments between May and June, a bit later than expected. The EIA expects that Saudi Arabia’s decision to ease curtailments over the course of several months, and not just in May, will contribute to moderate tightness in oil markets for the second quarter of 2021.

EIA projects that West Texas Intermediate (WTI) crude oil will average \$58.91/bbl in 2021 and \$56.99/bbl in 2022. The Brent (North Sea) crude oil spot price is forecast to average \$62.26/bbl and \$60.74/bbl, respectively. WTI and Brent are light sweet crudes used as international benchmarks in spot market pricing. The price of crude oil is closely tied to that of gasoline, as seen in the graph below.



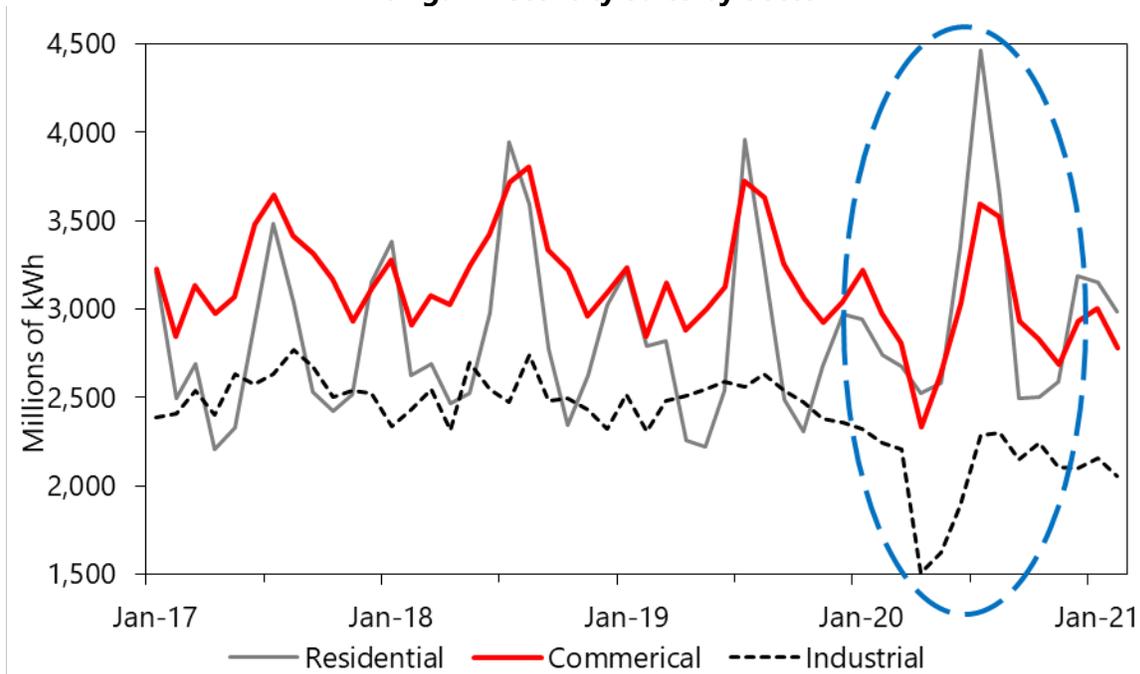
Sources: U.S. Energy Information Administration, Short-Term Energy Outlook April 2021  
 Note: Gasoline prices are for regular unleaded, including taxes.

## Electricity

### Demand

COVID-19 had a noticeable impact on electricity consumption in Michigan. Total electricity sales declined by 5% (5.09 billion KWh) in 2020 compared to the previous year. Declines were led by the industrial sector (16%) and followed by the commercial sector (6%). Conversely, residential usage increased in 2020, totaling 35.7 billion kilowatt hours – a 6.6% increase. The impacts of COVID-19 on Michigan’s electricity consumption can clearly be seen in the graph below, with significant drop offs for the industrial and commercial sectors, and an abnormally high spike in residential sales as Michigan residents began to work from home.

## Michigan Electricity Sales by Sector



Source: Energy Information Administration

Residential and commercial electricity consumption is largely dependent on weather resulting in demand fluctuations for heating and cooling. In 2020, the summer cooling season (May-Sept.) was 22% warmer than normal. Current Climate Prediction Center (CPC) degree day forecasts indicate another warmer than normal (8%) summer for 2021 (May-Sept), which may lead to increased electricity use over the summer. Industrial sector usage of electricity, which is less dependent on weather fluctuations and more highly correlated to economic activity, declined by 16% (4.9 billion KWh) in 2020 due to the economic impact of COVID-19.

According to MISO's 2021/22 Planning Resource Auction results,<sup>15</sup> this summer's projected combined coincident system peak electric demand – including retail choice – plus planning reserve margin requirements for a large portion of the lower peninsula primarily comprised of the joint Consumers Energy and DTE Electric service areas is expected to be 21,459 megawatts (MW). For comparison, the 2020 summer projected combined coincident system peak electric demand including retail choice plus planning reserve requirements was projected to be 21,945 MW for the same footprint.<sup>16</sup> In 2020, the actual electric demand for bundled customers in Consumers Energy's service territory peaked at 7,675 MW and in DTE's service territory at 10,337 MW – both occurring on July 9. Electricity consumption typically peaks during hotter summer periods as air conditioner usage spikes for businesses and residents.

### Supply

To serve Michigan's electrical needs, load serving entities in Michigan rely in part on power purchased from wholesale markets operated by the MISO and PJM Interconnection (PJM).

<sup>15</sup> MISO 2021/22 Resource Planning Auction Results – <https://cdn.misoenergy.org/PY21-22%20Planning%20Resource%20Auction%20Results541166.pdf>

<sup>16</sup> MISO 2020/21 Planning Resource Auction Results: <https://cdn.misoenergy.org/2020-2021%20PRA%20Results442333.pdf>

Compared to 2020/2021, the amount of generation capacity required to serve Michigan's Lower Peninsula (Zone 7) decreased by 178.1 MW in 2021/2022, while the amount of generation capacity needed to serve Michigan's Upper Peninsula and the eastern half of Wisconsin (Zone 2) rose by 358.1 MW.<sup>17</sup> In comparison to 2020/2021, imports into Zone 7 this year decreased from 217.8 MW to 0 MW, and imports into Zone 2 decreased from 138.2 MW to 0 MW.

The 2021/2022 MISO Planning Resource Auction clearing prices for Zone 7 and Zone 2 was \$5/MW-Day. This compares to \$257.53 and \$5/MW-Day in last year's auction, respectively. The significant decrease in the Zone 7 clearing price is due to a significant reduction in the local clearing requirement as well as a slight reduction in peak demand.<sup>18</sup> MISO-wide, the predominant fuel types to clear the 2021/22 auction were natural gas (40% - up 2%) and coal (34% - no change). Nuclear (9%), solar (1%), and wind (3% - up 1%) were also represented in the auction. Although wind and solar represent a small portion of the overall capacity in the MISO region, 1,426 MW of solar and 3,590 MW of wind capacity cleared the 2021/2022 auction, compared to 850 MW and 3,275 MW in the previous year, respectively.

The 2021/2022 auction results indicate that the MISO region will have enough generation capacity to meet its planning reserve margin requirement for the 2021/2022 planning year (June 1, 2021, through May 31, 2022). MISO maintains a reserve margin requirement in order to ensure adequate generation capacity is available in the event of unexpected outages, extreme weather, or infrastructure damage.

## Price

Year-over-year changes in residential electrical bills can vary substantially from utility to utility, with some residents seeing their bills decrease while other bills increase. Residential bills in areas of the Central and Western Upper Peninsula, where population densities tend to be lower and the local power grid is challenged by various constraints imposed on and by the surrounding electrical generation and transmission systems, continue to be some of the highest in the state.

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<sup>17</sup> More precisely, capacity in MISO's PRA is measured in ZRCs (zonal resource credits), where one ZRC is equal to one megawatt of unforced capacity from a planning resource for a specific planning year pursuant to MISO tariffs.

<sup>18</sup> The 2021/22 Zone 7 Local Clearing Requirement was 19,710.1 MW, reduced from 21,850.7 MW in the 2020/21 PRA. The reduction in the Local Clearing Requirement meant that a lower amount of local resources were required to clear the auction this year compared to last year resulting in significantly lower capacity prices.

## Michigan Electric Rate Comparison

	2020		2021		Percent Change
	Monthly Bill	¢/kWh	Monthly Bill	¢/kWh	
<b>INVESTOR OWNED</b>					
AEP (I&M) Combined	\$81.67	16.33	\$86.05	17.21	5.4%
Alpena Power	\$73.36	14.67	\$68.79	13.76	-6.2%
Consumers Energy	\$79.46	15.89	\$93.22	18.64	17.3%
DTE Electric	\$84.68	16.94	\$89.41	17.88	5.6%
Northern States Power	\$64.98	13.00	\$67.78	13.56	4.3%
UMERC - (FORMERLY WEPCO)	\$73.51	14.70	\$74.12	14.82	0.8%
UMERC - (FORMERLY WPS)	\$69.06	13.81	\$71.45	14.29	3.5%
Upper Peninsula Power	\$108.38	21.68	\$109.98	22.00	1.5%
<b>COOPERATIVE</b>					
Alger Delta	\$102.43	20.49	\$102.42	20.48	0.0%
Cherryland	\$78.27	15.65	\$77.55	15.51	-0.9%
Cloverland	\$70.48	14.10	\$70.48	14.10	0.0%
Great Lakes	\$88.12	17.62	\$87.37	17.47	-0.9%
Homeworks Tri-County	\$90.45	18.09	\$90.44	18.09	0.0%
Midwest	\$89.05	17.81	\$93.31	18.66	4.8%
Ontonagon County REA	\$123.33	24.67	\$123.33	24.67	0.0%
Presque Isle	\$73.79	14.76	\$76.20	15.24	3.3%
Thumb	\$78.02	15.60	\$78.01	15.60	0.0%
<b>MUNICIPAL</b>					
Holland Board of Public Works*	\$73.08	14.62	\$70.58	14.12	-3.4%
Lansing Board of Water and Light	\$83.78	16.76	\$84.39	16.88	0.7%
Marquette Board of Light and Power	\$80.09	16.02	\$73.94	14.79	-7.7%

Note: Monthly Bill calculations are based on usage of 500 kWh/month and exclude state sales tax.

\*Includes participation in renewable energy program.

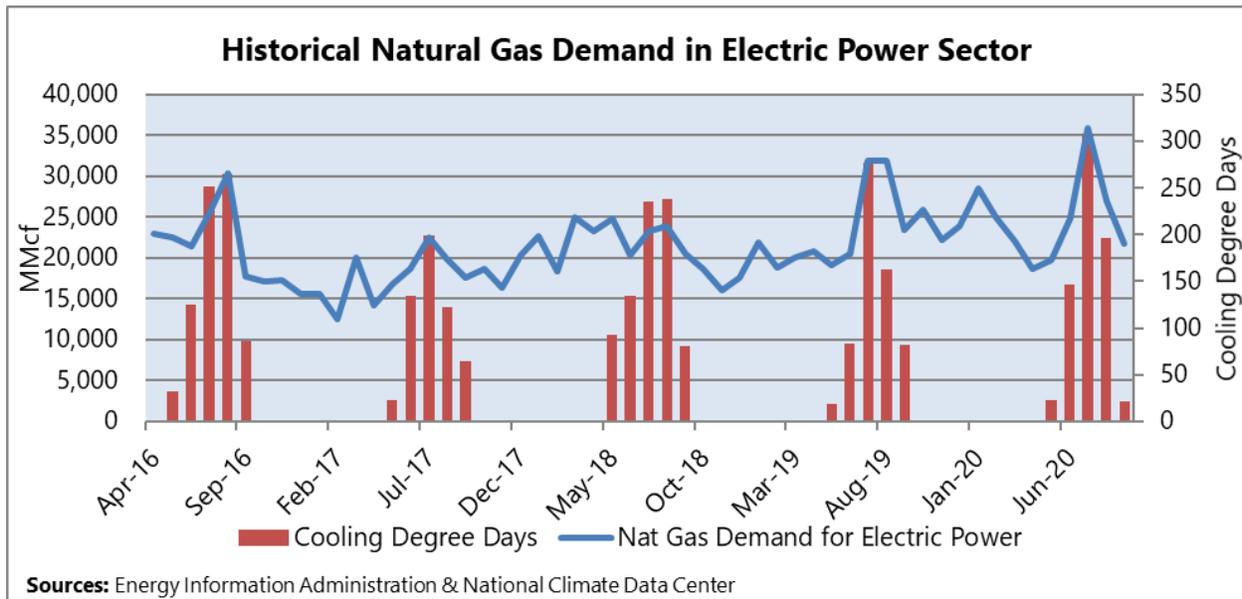
## Natural Gas

### Demand

Like other energy resources, total natural gas demand in Michigan likely declined in 2020 because of COVID-19. Though annual consumption data for industrial and commercial consumers is currently not available from the EIA, residential demand declined by 6 percent. The EIA expected the most significant impacts of COVID-19 to be on the industrial sector as restrictions were implemented and economic activity slowed – and if the decline in electricity consumption from the sector is any indication, this likely came to fruition.

Weather variation greatly affects natural gas usage in the electric power sector. Natural gas demand by the electric power sector has been upward trending in recent years and additional use from an anticipated increase in cooling needs this summer could help to counterbalance declines from the industrial and commercial sectors. Current projections from NOAA’s Climate Prediction Center (CPC) indicate that the 2021 summer cooling season (May-September) may be about 8% warmer than the 1981-2010 normal. Deviations from these weather projections could lead to very different consumption patterns as homes and businesses increase their electricity use to combat

the heat. In addition to weather influenced demand, consumption for electricity generation is likely to be influenced by the price of natural gas. Henry Hub natural gas spot prices are forecasted to average \$2.99 per thousand cubic feet (Mcf) this summer compared to \$1.95 per Mcf last summer.



### Supply

Working gas storage inventories for the lower 48 states were 2,100 Bcf for the week ending May 14, 2021, 13% lower than last year. Natural gas storage levels are normally at their lowest levels by the end of the heating season in March and are built up during the summer months. Michigan’s working gas storage volume gradually increases throughout the summer, with the previous five-years averaging 625.9 Bcf by October. Storage injection typically begins after the end of the heating season and is sensitive to both current market prices as well as price expectations for the upcoming heating season. About 10% of Michigan’s natural gas needs are supplied via its own natural gas production wells. However, this production continues to slowly decline as the wells age and will eventually become uneconomical and will be decommissioned.

Additional factors that may influence supply and prices include summer temperatures and infrastructure outages. A warm summer causes electricity generators to use more natural gas for peak generation. This increased use of natural gas to meet peak electric loads would exert additional pressure on supply and prices. Damage to major natural gas production or transmission infrastructure, such as from an active hurricane season in the Gulf of Mexico, can also drive up prices. However, with the emergence of shale gas (natural gas produced from shale in Pennsylvania and Ohio) and new pipeline infrastructure for transport, Michigan has become less reliant on natural gas from the Gulf of Mexico producing region. This increase in supply diversity will help to keep gas prices relatively stable in Michigan for the upcoming year.

### Price

Natural gas wholesale (spot) prices were a bit more volatile last winter, averaging approximately \$3.30/Mcf (million cubic feet) after spiking to \$5.56/Mcf in February. During March 2021, the Henry Hub futures price for June contracts averaged \$2.72/Mcf, which is \$0.85 above the average price at the same time in 2020.

The Energy Information Administration’s (EIA) May STEO projects Henry Hub natural gas spot prices to average \$3.17/Mcf through 2021 with prices lowering to an average of \$3.13 for 2022. The EIA’s projected prices reflect lower U.S. production levels combined with increasing exports. These projections, however, do not consider potential damage to natural gas production from an active hurricane season in the Gulf of Mexico. NOAA’s Climate Prediction Center is forecasting an above normal 2021 Atlantic hurricane season, with potentially 3 to 5 major hurricanes developing.

The average monthly summer bill for the four largest gas utilities<sup>19</sup> (Gas Cost Recovery (GCR) factor + distribution charge + customer charge) in Michigan is projected to be approximately \$36.79 for April 2021 through October 2021. The commodity cost makes up about 27% of this price. A residential customer’s annual gas bill for April 2021-March 2022 period is forecasted to be \$824 based on the May 2021 billed GCR factors. If prices remain at current levels, this year’s average annual gas bill is expected to be \$63 higher than last year’s annual bill based on normal consumption for both years.

	<b>Cost Breakdown (per Mcf)</b>			<b>Customer Charge (monthly)</b>	<b>April 2021 - March 2022 Bill Forecast</b>
	<b>Commodity Charge</b>	<b>Distribution</b>	<b>Total Average Cost</b>		
<b>Four Largest Gas Utilities</b>	\$2.77	\$4.16	\$6.93	\$12.67	\$824

Note: commodity charge refers to the price of fuel; April 2021 - March 2022 usage is estimated at 97 Mcf.

## Conclusion

As the busy summer season approaches, residents should expect energy supplies to be readily available to meet their needs – whether that be turning on the air conditioning to cool their home, fueling up the family vehicle for a trip, or firing up the grill. Michigan’s energy systems remain robust and are well positioned to meet the evolving needs of consumers in the state. MPSC Staff will continue their work to ensure this robustness and remain watchful for the ever-present risks to the state’s energy systems.

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<sup>19</sup> Consumers Energy, DTE Gas (formerly MichCon), SEMCO, and Michigan Gas Utilities (MGU)