Michigan Public Service Commission

Michigan Energy Appraisal

Winter 2020-21

October 29, 2020

Daniel C. Scripps, Chair
Sally A. Talberg, Commissioner
Tremaine L. Phillips, Commissioner

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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 patterns and levels throughout the state and has posed unique challenges to Michigan's energy systems. Past editions of the Energy Appraisal provided a short-term outlook for energy supply and demand dynamics by the MPSC's Energy Security. However, this year's Winter Energy Appraisal will be a special edition highlighting the impacts of COVID-19, as well as the uncertainties for Michigan's energy system going forward. A special edition of the Energy Appraisal was chosen for several reasons including: the time lag on available data to accurately quantify the effects on energy demand, policy decisions to protect the well-being of the public, and uncertainty surrounding the duration of COVID-19. The aforementioned factors make projecting future energy supply and demand extremely speculative; therefore, a discussion on both known and potential impacts was deemed more appropriate.

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.

Project Manager	Alex Morese
Motor Fuels	Ethyan Kramer
Electric	Ethyan Kramer
Natural Gas	Nora Quilico, Ethyan Kramer
Petroleum	Ethyan Kramer
Trending Topics	Ethyan Kramer

A major source of data and analysis used in this 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. The Energy Appraisal is available at:

https://www.michigan.gov/documents/mpsc/2020_21_Winter_Appraisal_Final_706079_7.pdf

Comments or questions on this appraisal are welcomed and may be directed to Alex Morese, Michigan Public Service Commission, PO Box 30221, Lansing, Michigan 48909, phone (517) 284-8310, or email moresea@michigan.gov.

If you would like to receive the biannual Energy Appraisal via email, subscribe to the listserv.

Issued: October 29, 2020	*The Commission does not discriminate on the basis of age, color, disability, education, familial status, gender expression, gender identity, height, income, marital status, military status, national origin, political beliefs, race, religion, sex, sexual orientation, or weight in the administration of any of its programs or activities, and does not intimidate or retaliate against any individual or group because they have exercised their rights to participate in or oppose actions protected by applicable laws and regulations, or for the purpose of interfering with such rights, and claims of intimidation and retaliation will be handled promptly if they occur.* *https://www.michigan.gov/documents/mpsc/BYLAWS_OF_MPSC_649810_7.pdf*

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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 slowing economies around the world.

On March 23, Governor Whitmer issued Executive Order 2020-21 (Stay Home Stay Safe) to help halt the spread of COVID-19 and protect Michigan residents. Executive Order 2020-21 had a significant impact on Michigan's economy as the state limited activities to curb the transmission of the virus.

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.

The Coronavirus pandemic has had significant effects on Michigan's energy landscape and will continue to have an ongoing impact for the foreseeable future. COVID-19 has changed consumption patterns and levels throughout the state and has posed unique challenges to the resilience of Michigan's energy systems. Past editions of the Energy Appraisal provided a short-term outlook for energy supply and demand dynamics by the MPSC's Energy Security Section. For reasons discussed in the Preface, this year's Winter Energy Appraisal will be a special edition highlighting the impacts of COVID-19, as well as the uncertainties for Michigan's energy usage going forward. The core analyses in this winter's edition of the Michigan Energy Appraisal were compiled by Michigan Public Service Commission staff and projections sourced from the Energy Information Administration of the U.S. Department of Energy.

Some key report findings for Michigan energy sectors:

- Current **weather** projections from NOAA's Climate Prediction Center indicate that the 2020/21 winter heating season (Nov.-March) will likely be near normal, with expectations of increased precipitation.
- The industrial sector is expected to have the most significant decline in consumption of **natural gas** due to COVID-19 slowing economic activity. Demand from the electric power sector has been trending upwards and warmer-than-normal temperatures this past summer further increased consumption.
- Retail prices for **propane** started the 2020/21 heating season at an average of $1.66/gallon, a $0.06/gallon increase from this time last year. Midwest propane stocks entered the heating season near the five-year average, standing at 27 million barrels.

- **Electricity** sales in Michigan and surrounding regions declined noticeably since the onset of COVID-19. No supply shortages or transmission constraints are expected to affect the ability of Michigan utilities to meet peak electric demand for this winter. Residential electric rates are generally higher, as customers of seven investor-owned utilities saw a price increase, and one saw no change between October 2019 and October 2020.

- Demand for **motor gasoline** in 2019 declined for the first time since 2012, falling 4.3 percent to 4.6 billion gallons. The Energy Information Administration expects Midwest gasoline prices to average $2.02 in 2020, 46 cents lower than in 2019.

- An estimated 5.1 million barrels of **crude oil** were produced in Michigan in 2019, down marginally from 5.4 million barrels in 2018. Jackson County remains the top crude oil producing county in the state, reaching an estimated 667 thousand barrels in 2019. Prices for Michigan sweet and sour crude oil averaged about $50/barrel and $45/barrel in 2019, respectively.

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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	Brent is 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

Energy Supply/Reliability – *Enbridge Energy Public Act 16 Filing (Case No. U-20763)*

On April 17, 2020, Enbridge Energy filed an application with the Michigan Public Service Commission (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 (the replacement pipe segment) located within a concrete-lined tunnel below the lakebed of the Straits. See michigan.gov/MPSCLine5 for more information on the status of this case.

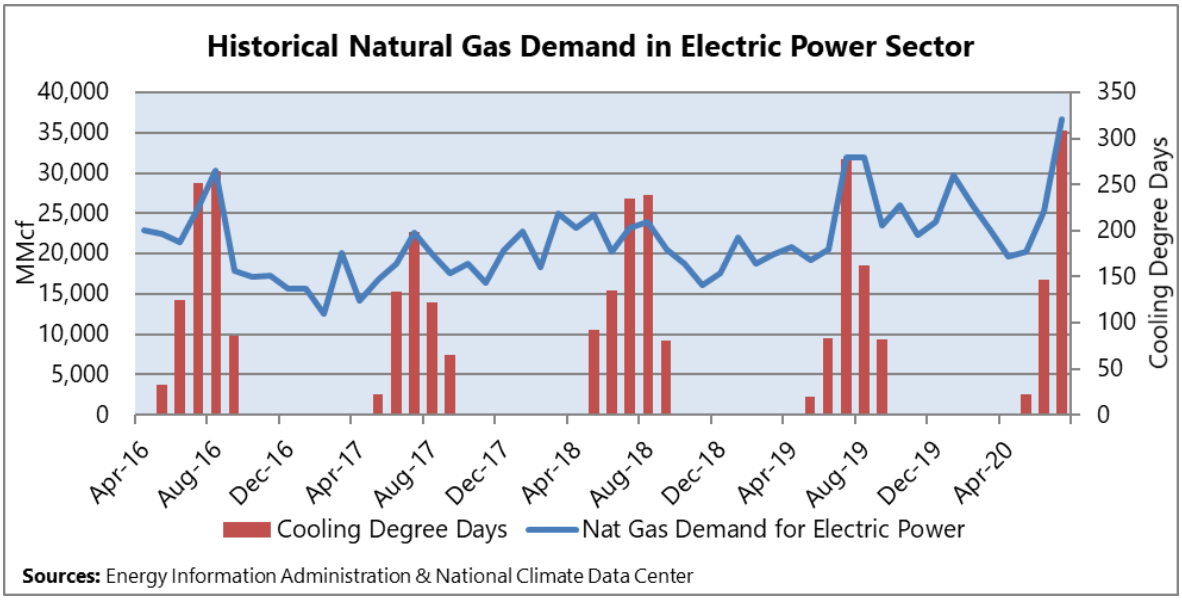
Electric Supply/Reliability - *2020-2021 Planning Resource Auction*

Each spring, the Midcontinent Independent System Operator (MISO) holds its Planning Resource Auction (PRA), where load serving entities (LSE) in the MISO footprint acquire electric capacity to serve their customers during the upcoming planning year (June 1 – May 31). This year, MISO Local Resource Zones 2 and 7, which cover most of Michigan's Upper and Lower Peninsulas, cleared at $5.00 and $257.53 per MW-day, representing an increase of $2.01 and $233.23 per MW-day, respectively. The significant increase in the Zone 7 clearing price is a result of the zone not meeting its local clearing requirement for procuring resources from within its own borders. According to MISO's FERC approved rules, the clearing price is set at the Cost of New Entry (CONE), which represents the current annualized capital cost for constructing a new power plant. According to MISO, the overall auction results reflect the industry's ongoing shift away from coal-fired generation and increasing reliance on natural gas-fired and renewables generation.

Natural Gas

Demand

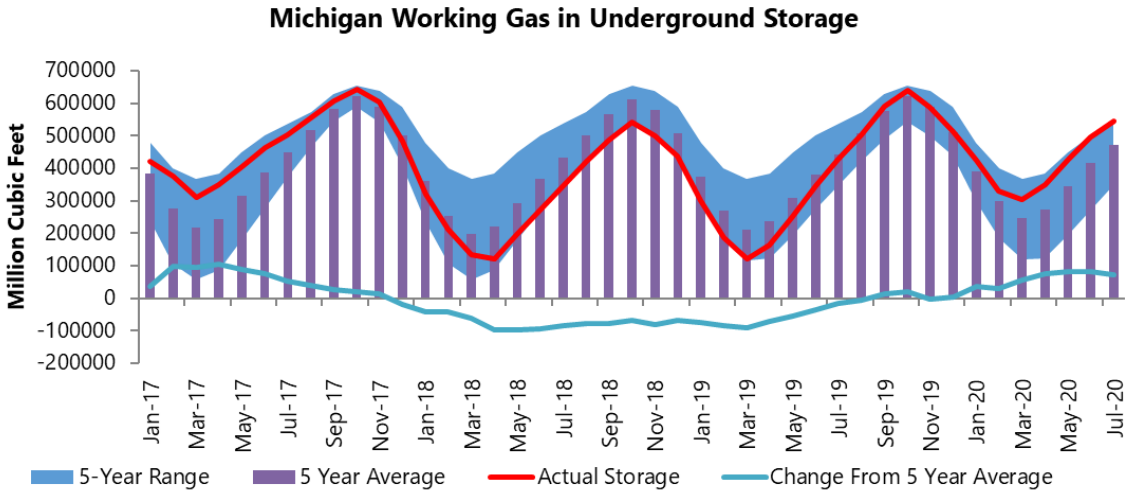
Like other energy resources, natural gas demand in Michigan will likely decline for 2020 as a result of COVID-19. The EIA expects the most significant impacts to be in the industrial sector as COVID-19 restrictions were implemented and economic activity slowed. Commercial business closures will also contribute to a decline in natural gas demand, as the fuel is used to cook food and heat water. 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 a warmer than normal summer could help to counterbalance declines from the industrial and commercial sectors. Residential natural gas consumption – where it is used to heat about 77 percent of Michigan households – has the potential to be higher this year as more residents remain at home and work remotely. Current projections from NOAA's Climate Prediction Center (CPC) indicate that Michigan will experience near normal temperatures for the 2020/21 winter heating season (Nov.-March), with expectations of increased precipitation. Deviations from these weather projections could lead to very different consumption patterns as homes and businesses adjust their heating needs.



Supply

Working gas storage inventories for the lower 48 states were 3,926 Bcf for the week ending October 16, 2020, 9% higher 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 620.8 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, becoming uneconomical and shut in.



Source: Energy Information Administration

Price

EIA forecasted residential natural gas prices for the Midwest this coming winter are slightly lower than the previous winter at $7.35/Mcf. The wholesale (commodity) price for winter '20-21 natural gas, determined by futures trading on the Chicago Mercantile Exchange (CME) averaged approximately $2.94/Mcf (thousand cubic feet) this summer for the coming winter's future strip. The current prompt month of November is trading at an average price of $2.43/Mcf.

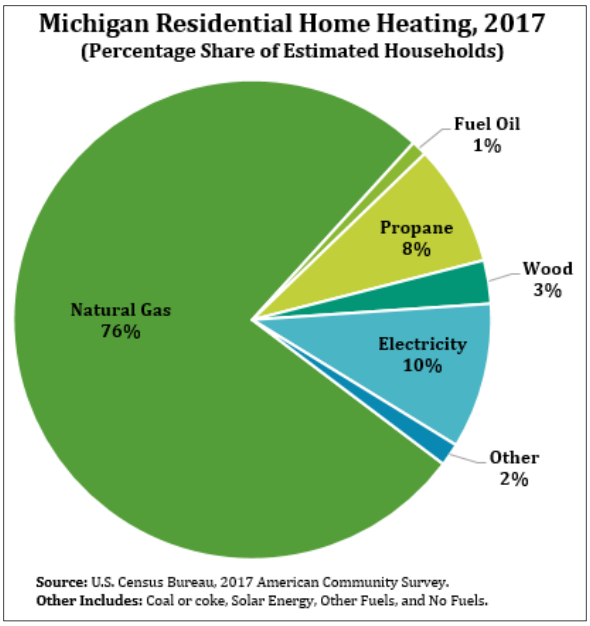
The EIA's October STEO projects Henry Hub natural gas spot prices to average $2.15/Mcf for 2020 with prices rising to an average of $3.25 for 2021. The EIA's projected prices reflect higher levels of storage currently, but there is also the expectation that production over the next several months will continue to decline in 2021. This decline, along with the usual seasonal demand increase and growing LNG exports will draw down natural gas inventories and tighten the market.

The total residential bill for natural gas service is comprised of the wholesale cost of gas purchased by Michigan utilities (Gas Cost Recovery (GCR) factor), the cost of interstate transport and delivery, the monthly customer charge, and the energy waste reduction surcharge used to implement energy efficiency programs. The projected weighted average commodity price (GCR factor/fuel cost) for residential customers of regulated utilities in Michigan during the November 2020 through March 2021 winter is currently $2.70/Mcf compared to last year's actual average of $2.85/Mcf.

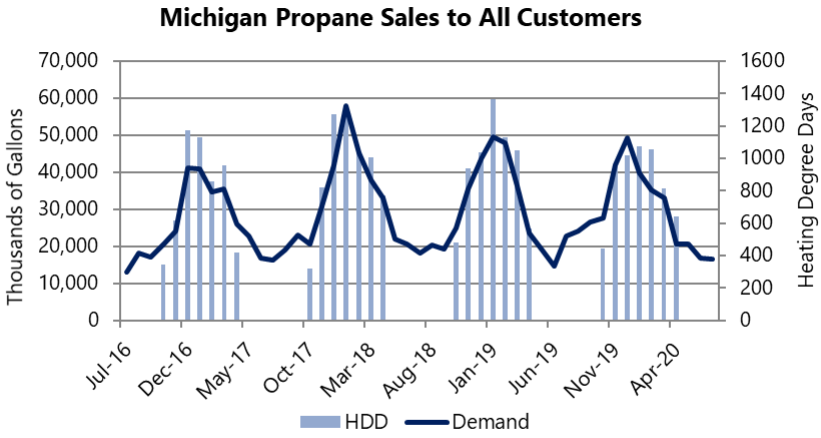
Propane

Demand

According to the EIA, about 5 percent of U.S. households heat with propane; however, in Michigan it is estimated to be a little more than 8 percent. Weather remains the largest determinant of propane use for residents. Heating degree day (HDD) forecasts by the National Oceanic and Atmospheric Association (NOAA)[1] indicate Michigan will likely experience near normal temperatures throughout the 2020/21 winter heating season, totaling 5,295, 0.5 percent lower than the 1981-2010 normal of 5,321.



Another primary use for propane in the Midwest, including Michigan, is for the drying of harvested corn crops. When corn crops are planted late in the spring, or when the fall is especially wet, demand for propane from the agriculture sector may rise due to the increased need to dry down their crop for it to be stored without high risk of spoilage. As of October 19, 2020, many Midwestern states including Michigan, Iowa, Indiana, Illinois, and Minnesota were showing corn progress ahead of the five-year average – an indication there may be reduced propane demand for grain drying this fall.

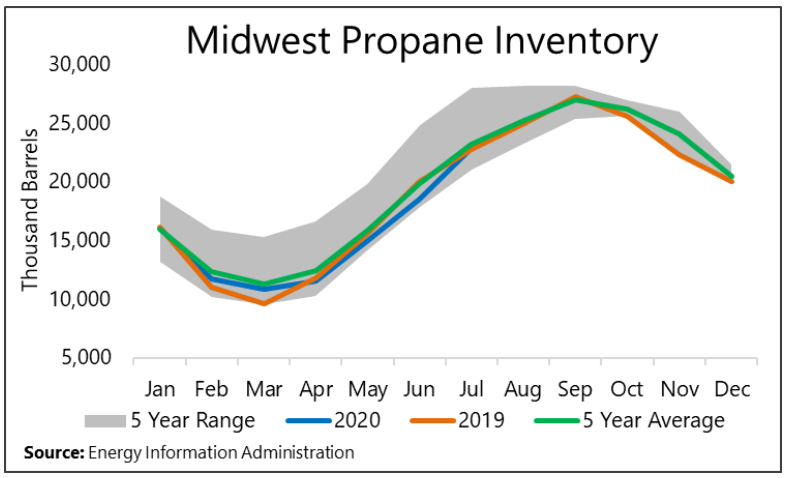


Source: Historical Data - Energy Information Administration & National Climatic Data Center

[1] NOAA, Climate Prediction Center - http://www.cpc.ncep.noaa.gov/products/predictions/long_range/seasonal.php?lead=2

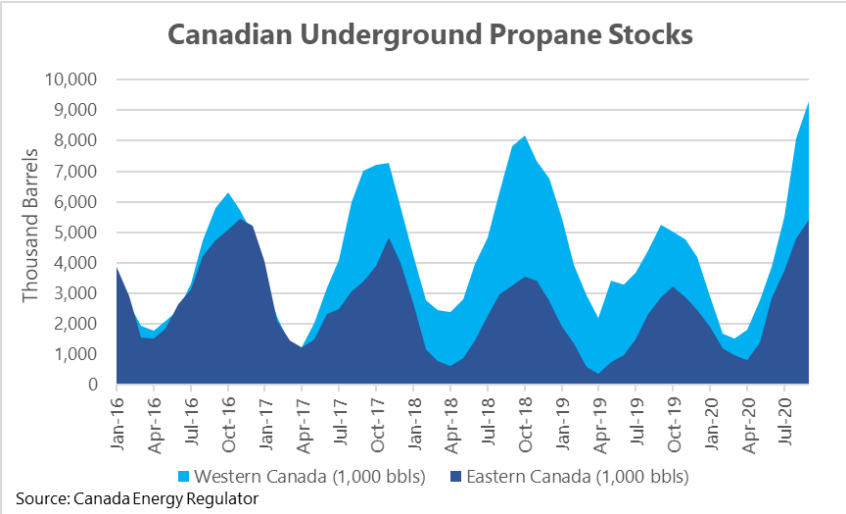
Supply

Due to an abundance of natural gas liquids (resulting from natural gas drilling) and buoyed by continued strength in the propane export markets, U.S. propane production remains high – averaging 2.25 million b/d to begin October. The four-week average Midwest propane production for the week ending October 16, 2020, was 452,000 b/d, down just 4.2 percent from the same period last year.



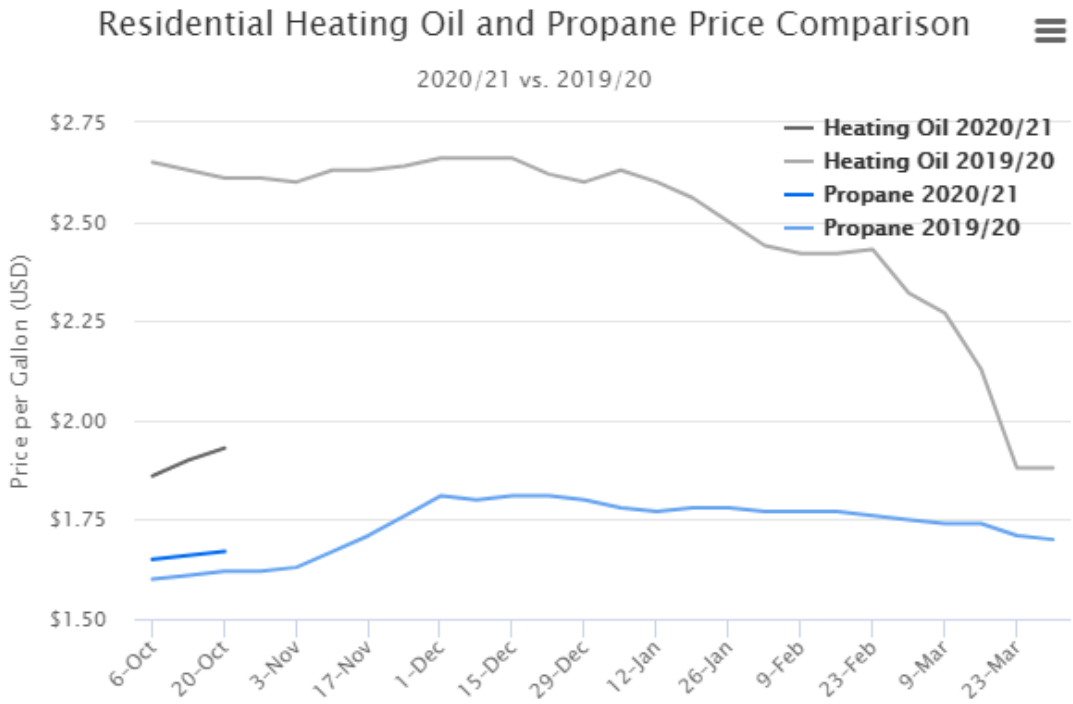
U.S. inventories of propane and propylene reached 98.3 million barrels as of October 16, 3 percent above levels seen at the same time last year. According to the EIA, PADD 2 (Midwest) propane and propylene stocks totaled 25.8 million barrels as of October 16 (down about 1 million barrels from 2019) but still near five-year average for this time of the year.

In addition to domestic propane supply, many regions of the U.S. rely on supplies from Canada that are transported by pipeline, rail, and truck. Major Canadian underground storage facilities are primarily located in western Canada (Alberta) and in eastern Canada (Ontario). According to the MPSC's Statewide Energy Assessment, approximately 18.7 million barrels of underground cavern storage capacity for hydrocarbon gas liquids, such as propane, is located in Ontario near the Sarnia and Windsor areas. According to Canada Energy Regulator data, underground propane stocks to begin September totaled 5.4 million barrels in eastern Canada, and 9.3 million barrels in western Canada – a year-over-year increase of 88 and 77 percent, respectively.



Price

Retail propane prices were relatively stable during the winter of 2019/20, starting the heating season at $1.60 per gallon and peaking at $1.81 per gallon. The average price of propane between October and March was $1.73 per gallon in Michigan, a decrease of about 14 percent from the survey period in 2018/19. According to the EIA, wholesale propane prices in Michigan started this heating season at $0.59 per gallon (1 cent lower than prior year), indicating no current issues with product availability. Lower oil and natural gas prices, which feed into propane prices, will likely lead to a decrease in prices paid for propane this winter. For the week of October 19, 2020, the average residential propane price in Michigan was around $1.67/gallon.

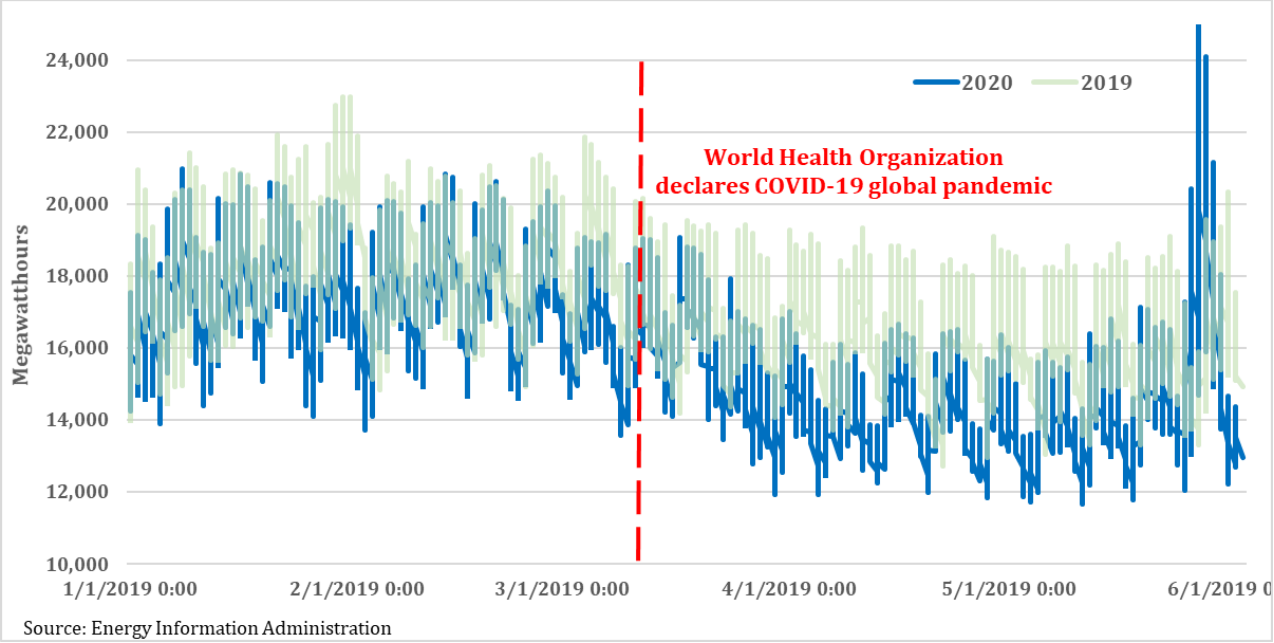


Electricity

Demand

COVID-19 had a noticeable impact on electricity demand in Michigan and the surrounding interconnected electrical grid operated by the Midcontinent Independent System Operator (MISO). As can be seen in the graph below, peak hourly demand in Zone 7 (Michigan's Lower Peninsula) and Zone 2 (Michigan's Upper Peninsula) after the onset of the pandemic dropped from about 20,000 megawatt hours (MWh) to 16,000 MWh and is much lower overall when compared to 2019. According to MISO, electric load for the entire footprint for the week of March 28, 2020 through April 3, 2020 averaged 7% lower than normal, as stay-at-home ordinances were enacted. Electric load in the following four weeks through the end of April, averaged 9.5%, 10.8%, 9.6%, and 11.5% lower than normal.[2]

MISO Zone 2 & 7 Combined Demand (Hourly)



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. However, current Climate Prediction Center (CPC) degree day forecasts indicate a near normal (0.5% less HDDs than normal) winter for 2020 (Nov.-March), which may lead to slightly less electricity use over the winter. Industrial sector demand for electricity,

[2] COVID-19 Impacts to MISO Load – https://cdn.misoenergy.org/20200524%20COVID%2019%20Impacts%20to%20MISO%20Load%20and%20Outage449135.pptx

which is less dependent on weather fluctuations and more highly correlated to economic activity, will likely be lower for 2020 due in part to the economic impact of COVID-19.

During the 2020 summer cooling season, neither DTE nor Consumers Energy had to interrupt service to their customers due to emergency operating conditions. Furthermore, no supply shortages or transmission constraints are expected to affect the ability of Michigan utilities to meet peak electric demand for this winter. In addition to power that they generate, Michigan utilities can purchase electricity supply from wholesale markets administered by MISO and PJM as needed. Michigan's combined coincident peak electrical demand, for both the Consumers Energy and DTE Electric service areas this summer was 18,012 megawatts (MW). Consumers Energy's bundled peak electric demand this summer was 7,675 MW and occurred on July 9, 2020. DTE Electric's bundled peak demand was 10,337 MW and was also on July 9, 2020.

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). Compared to 2019/2020, the amount of generation capacity required to serve Michigan's Lower Peninsula (Zone 7) decreased by 84.1 MW in 2020/2021, while the amount of generation capacity needed to serve Michigan's Upper Peninsula and the eastern half of Wisconsin (Zone 2) rose by 53.1 MW.[3] In comparison to 2019/2020, imports into Zone 7 this year in the capacity auction increased from 164.4 MW to 217.8 MW, and imports into Zone 2 increased from 0 MW to 138.2 MW.

The 2020/21 MISO Resource Auction clearing prices for Zone 7 and Zone 2 were $257.53 and $5/MW-Day, respectively. This compares to $24.30 and $2.99/MW-Day in last year's auction. The significant increase in the Zone 7 clearing price is a result of the zone not meeting its local clearing requirement for procuring resources from within its own borders. MISO-wide, the predominant fuel types to clear the 2020/21 auction were natural gas (38%) and coal (34%). Nuclear (9%), solar (1%), and wind (2%) were also represented in the auction. Although wind and solar represent a small portion of the overall capacity in the MISO region, 850 MW of solar and 3,275 MW of wind capacity cleared the 2020/21 auction, compared to 680 MW and 2,697 MW in the previous year, respectively.

The 2020/2021 auction results indicate that the MISO region will have enough generation capacity to meet its planning reserve margin requirement for the 2020/2021 planning year (June 1, 2020, through May 31, 2021). 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. Although Zone 7 did not meet its local clearing requirement, load serving

[3] 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.

entities were still able to make market purchases and import electricity from other zones to serve Michigan customers adequately through the summer.

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 customers' bills rise. 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.

Michigan Electric Rate Comparison

	2019		2020		Percent
	Monthly Bill	¢/kWh	Monthly Bill	¢/kWh	Change
INVESTOR OWNED					
AEP (I&M) Combined	$71.68	14.34	$85.01	17.00	18.6%
Alpena Power	$65.17	13.03	$66.44	13.29	1.9%
Consumers Energy	$78.59	15.72	$79.06	15.81	0.6%
DTE Electric	$84.88	16.98	$89.32	17.86	5.2%
Northern States Power	$64.93	12.99	$64.97	12.99	0.1%
UMERC - (FORMERLY WEPCO)	$72.27	14.45	$77.11	15.42	6.7%
UMERC - (FORMERLY WPS)	$66.09	13.22	$72.39	14.48	9.5%
Upper Peninsula Power	$108.38	21.68	$108.37	21.67	0.0%
COOPERATIVE					
Alger Delta	$102.43	20.49	$101.51	20.30	-0.9%
Cherryland	$77.55	15.51	$77.55	15.51	0.0%
Cloverland	$70.48	14.10	$70.48	14.10	0.0%
Great Lakes	$88.12	17.62	$88.85	17.77	0.8%
Homeworks Tri-County	$87.38	17.48	$87.62	17.52	0.3%
Midwest	$89.05	17.81	$92.32	18.46	3.7%
Ontonagon County REA	$123.33	24.67	$123.33	24.67	0.0%
Presque Isle	$73.79	14.76	$74.65	14.93	1.2%
Thumb	$79.60	15.92	$76.90	15.38	-3.4%
MUNICIPAL					
Holland Board of Public Works	$73.08	14.62	$70.58	14.12	-3.4%
Lansing Board of Water and Light	$82.09	16.42	$83.38	16.68	1.6%
Marquette Board of Light and Pow	$78.07	15.61	$74.22	14.84	-4.9%

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

Motor Fuels

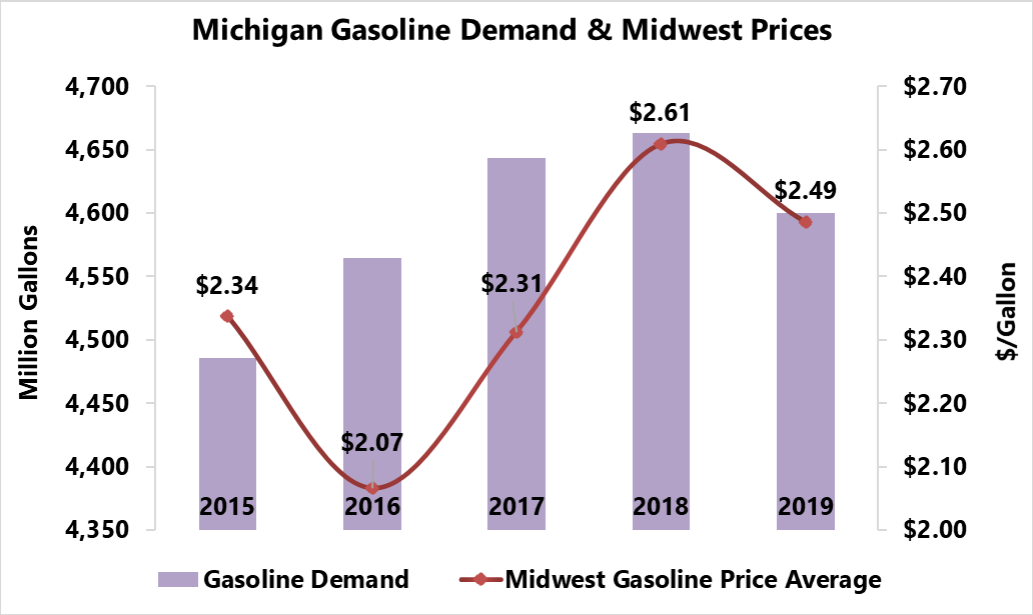
Demand

Gasoline demand in Michigan totaled 4.6 billion gallons for 2019, a decrease of 1.3% from 2018 and the first annual decline since 2012. Due to the effects of COVID-19, it is likely that gasoline demand will again decline for 2020. On March 23, 2020, Governor Whitmer issued Executive Order 2020-21 and was followed by 2020-42, 2020-59, 2020-96, and 2020-100, which directed Michigan residents to remain at home or in their place of residence to the maximum extent possible. With these executive orders to safeguard the health and well-being of residents, gasoline demand was significantly lowered throughout the state – averaging 47, 31, and 14 percent lower compared to the previous five-year average for the months of April, May, and June, respectively.

Total distillate (primarily diesel fuel) demand for 2019 was 1.18 billion gallons, down only slightly from 2018 at 1.19 billion gallons. Like motor gasoline, distillate demand will likely be negatively affected by COVID-19, although the extent of the decline may not be as severe. Ultra-low diesel fuel accounted for approximately 98% of total distillate demand in 2019, 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 decline as dramatically as motor gasoline over the past several months – averaging 18, 16, and 2 percent lower than the previous five-year average for April, May, and June, respectively.

The estimated all vehicle real-world fuel economy for the 2019 model year was 25.5 miles per gallon, an improvement from the 25.1 miles per gallon average in 2018.[4] Vehicle fuel efficiencies are at an all-time high, and with the uncertain long-term economic effects of COVID-19, demand for motor fuels in the state may experience a period of depressed demand while residential and commercial travel remains muted.

[4] EPA Automotive Trends Report: https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100YVFS.pdf



Source: Energy Information Administration

Supply

Michigan experienced an unordinary motor gasoline supply situation entering the typical summer 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 amount of volatile organic compounds in the atmosphere.[5] On March 30, 2020, Executive Order 2020-31 was issued to suspend the April gasoline RVP requirement in order to allow terminals to distribute remaining winter-grade fuel to make adequate space to receive compliant summer-grade fuel. Executive Order 2020-31 was rescinded, and Executive Order 2020-102 was issued on May 22, 2020, allowing retail gasoline stations to further receive non-compliant fuel through May 31, 2020, and distribute that fuel until June 30, 2020.

For the week ending October 16, 2020, 509 thousand barrels per day of gasoline were imported into the U.S. compared to 697 thousand barrels per day for the comparable week in 2019, a reduction of 27%. National gasoline inventories were well above the five-year range over the

[5] Reid vapor pressure requirements between June 1 and September 15 is 9.0 psi for all Michigan counties, excluding the counties of 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 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

summer but have since lowered slightly. For the week ending October 16, U.S. total gasoline inventories stood at 227 million barrels (26.5 days of supply), up 4 million barrels from the same time last year. Midwest inventories were at 48.3 million barrels, 300 thousand barrels lower than last year. Marginally lower year-over-year inventory levels in the fall of 2020 are likely due to lower refinery utilization rates.

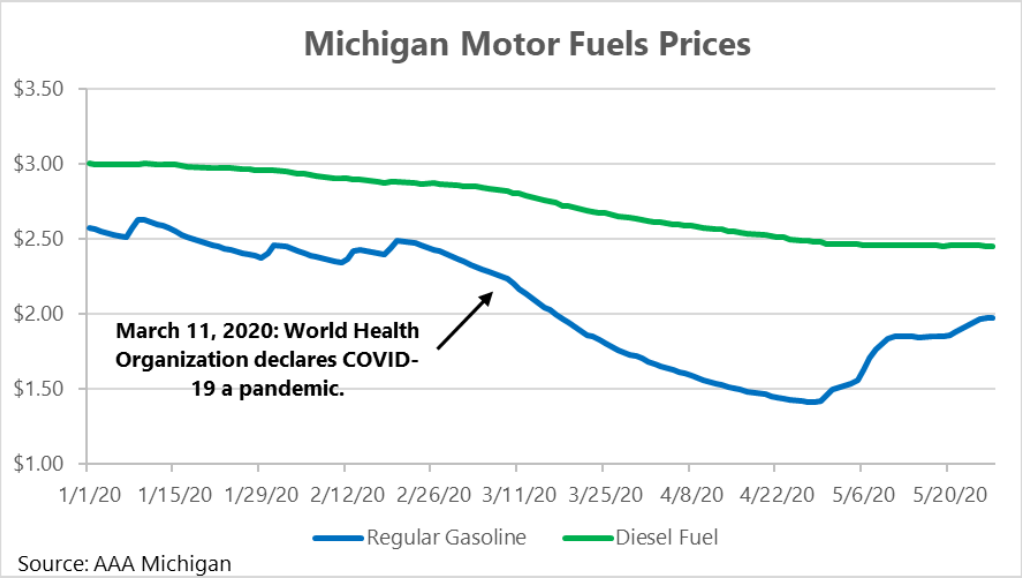
Midwest distillate stocks were higher entering this fall, standing at 28.8 million barrels for the week ending October 16, 2020. U.S. exports of distillate fuel oil has slowed in recent months, averaging 1.26 million barrels per day for the four weeks ending October 16, 2020. U.S distillate inventories have risen to levels above the five-year range and as of the week ending October 16, 2020, were at 160.7 million barrels, up from 120.8 million barrels a year ago.

Based on the most recent available data, the U.S. refinery utilization rate for the week ending October 16, 2020 was 72.9%, 12.3 percentage points lower than the comparable week of last year – a clear indication of the demand destruction COVID-19 has had on the U.S. petroleum refining sector.

Price

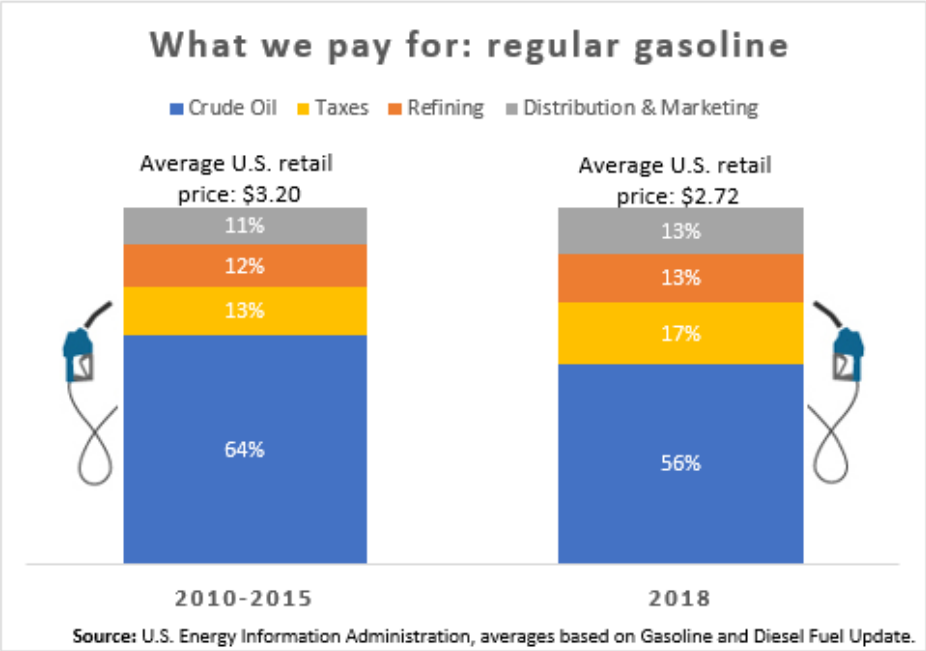
According to AAA, the average price for a gallon of regular unleaded gasoline in Michigan on October 23, 2020 was $2.10, compared to $2.58 a year ago. On-highway diesel prices for the same date were $2.37, down $0.62/gallon from a year ago. As was discussed earlier, lower year over year prices are a direct result of COVID-19 and the demand destruction that has taken place in petroleum markets. Relatively low crude oil prices are forecasted for the remainder of 2020, so consumers will likely enjoy lower gasoline and diesel fuel prices in the near-term.

The U.S. price of regular gasoline averaged $2.60/gallon in 2019, 12 cents lower than in 2018, and still far below the average price of $3.63/gallon in 2012. U.S. on-highway diesel fuel retail prices, which averaged $3.05/gallon in 2019, are projected by the EIA to average of $2.54/gallon in 2020.



Source: AAA Michigan

The EIA projects Midwest regular-grade gasoline prices to average $2.02/gallon for 2020, compared to $2.48/gallon last year. Unforeseen refinery outages, civil unrest, adverse weather conditions, or any other disruptions to supply may also have the potential to increase national product prices in the short term.



Passage of House Bill 4738, Public Act 176 of 2015, amended the Motor Fuel Tax Act to increase motor fuel taxes. Effective January 1, 2017, tax on gasoline increased from 19 cents per gallon to 26.3 cents per gallon. Gasoline tax rates will be adjusted annually based on consumer inflation (U.S. Consumer Price Index), with increases capped to 5% per year, effective January 1, 2022.

Petroleum

Michigan/Midwest Outlook

Michigan consumed an estimated 177 million barrels of petroleum products in 2018 (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 5.1 million barrels in 2019. Lead crude oil producing counties include Jackson in southern Michigan and Otsego and Manistee in the northern Lower Peninsula. Despite in-state production, the overwhelming majority 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.

Top Ten Michigan Crude Oil Producing Counties, 2019

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

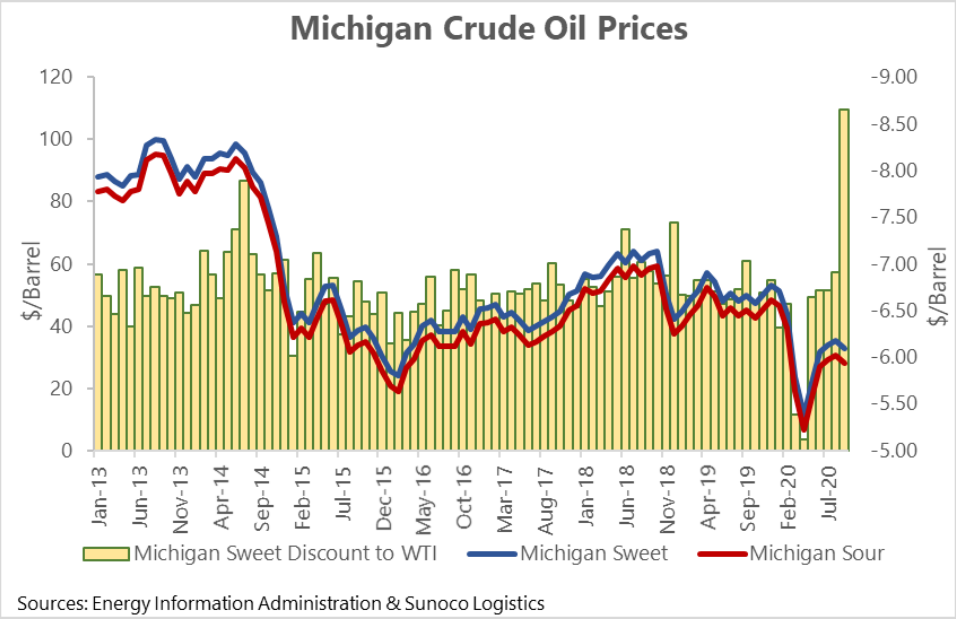
The crude is transported to and refined in Southeast Michigan at the Marathon Refinery, which processes approximately 132,000 barrels of crude oil per day (b/d) into gasoline, diesel fuel, petroleum coke, and asphalt. Refineries in neighboring states such as Illinois and Ohio meet the remainder of Michigan's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

According to the EIA, Michigan had 40 million barrels of proved crude oil reserves at the end of 2018.[6] 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. Production totaled 5.1 million barrels in 2019 and will likely decrease further for 2020 as the price for crude oil remains depressed. Crude oil stocks in the Midwest have grown in recent months as demand for petroleum weakens due to COVID-19, reaching 146.8 million barrels on October 16, 2020, a 13% increase 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 2020 at $41/barrel, which means Michigan crude oil producers might expect to receive $34/barrel for sweet blends and $29/barrel for sour

[6] 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*

blends, assuming historical discounts remain relatively stable. Prices at these levels may discourage Michigan producers from further exploration and development of additional wells, and instead focus on optimizing already producing wells.

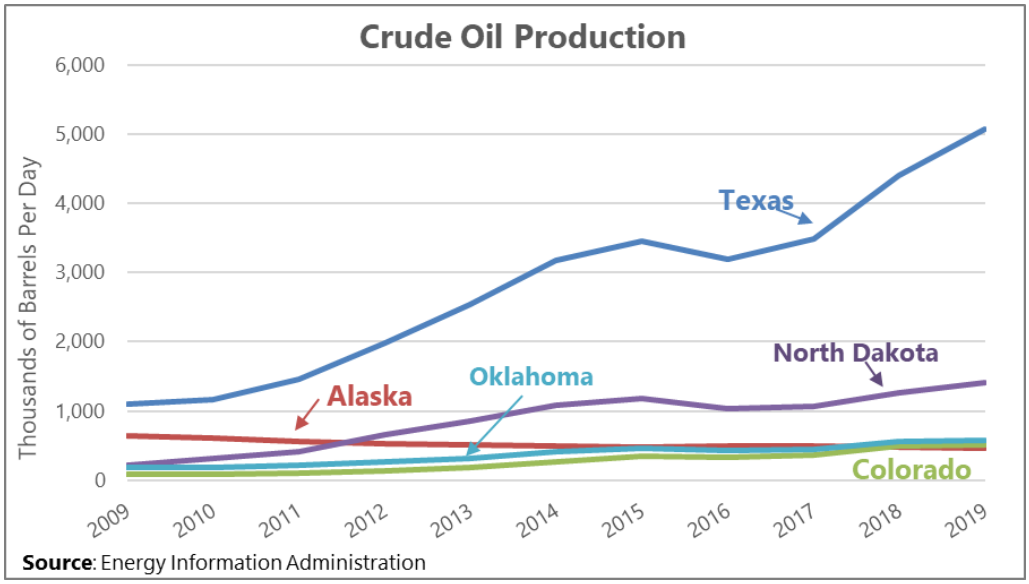


U.S. Outlook

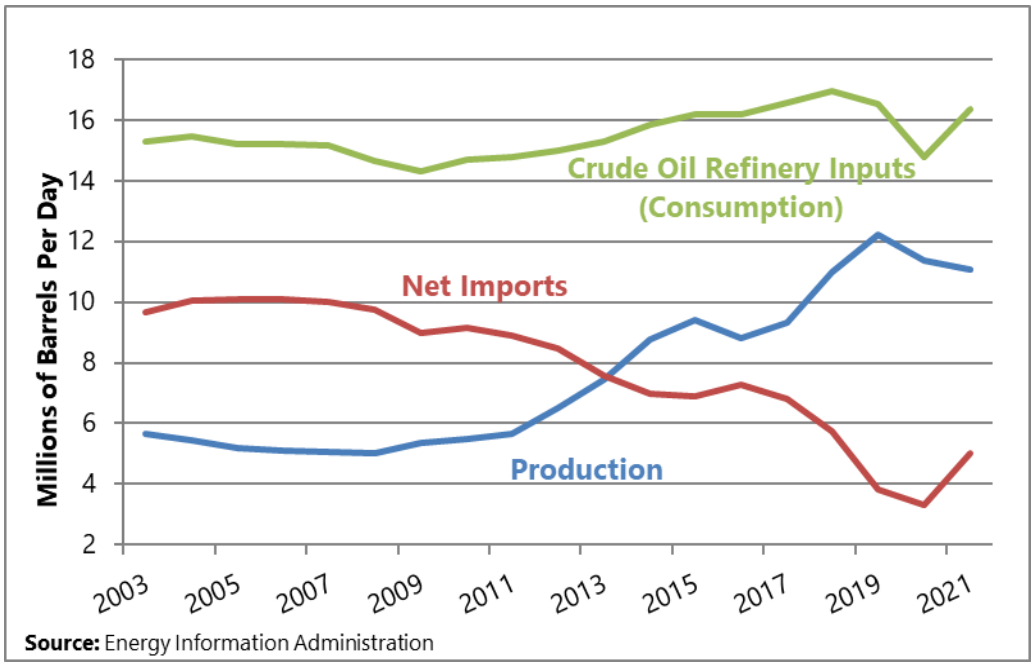
The EIA's October Short Term Energy Outlook (STEO) revised U.S. crude oil production figures upward from just a month ago, siting faster than expected returns of curtailed production. U.S. crude oil production averaged 12.25 million b/d in 2019 and is expected to decrease to 11.45 million b/d for 2020 and to 11.09 million b/d in 2021. The price for WTI began to decline in March of 2020 as petroleum demand weakened from the effects of COVID-19 and supplies of oil at large storage hubs increased. Price declines continued through April, averaging $16.55/barrel for the month, $41/barrel less than the January 2020 average. 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 for traders to find market participants to sell their futures contracts to in order to not have to take physical delivery of the crude oil. The extreme price volatility in April prompted the Texas Railroad Commission to consider a curtailment plan for crude oil production within the state, where a majority of the prolific Permian basin is located.

U.S. crude oil stocks have been on the rise since the beginning of 2020 and have eclipsed the upper bound of the five-year range for this time of year. As of October 16, 2020, the U.S. had 488 million barrels in inventory, about 13% above this time last year. U.S. crude oil exports – although

not at record levels, remain relatively strong given current economic circumstances, with the four-week average ending October 16, 2020 standing at 2.84 million barrels per day.



U.S. Crude Oil Demand and Net Imports



World Outlook

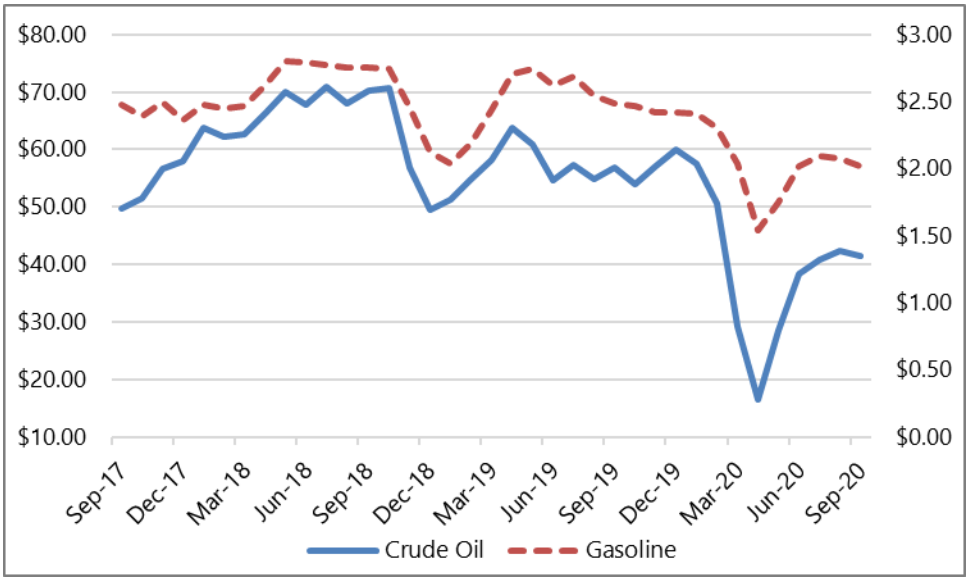
The EIA October STEO reports that global petroleum consumption will fall by 8.62 million b/d in 2020 before rebounding by 6.25 million b/d in 2021. The decline for 2020 is attributed to both

non-Organization for Economic Cooperation and Development (OECD) nations, as well as more developed regions, as the COVID-19 virus dampens economic growth and restricts global travel.

Global petroleum production and supply is expected to decline by 6.09 million b/d in 2020 and grow 4.25 million b/d in 2021. The 2020 consumption and production projections demonstrate why depressed oil prices are expected for the current year. When global consumption declines outpace production declines, the result will be a build in global crude oil inventories and subsequent weakness in prices. Global petroleum markets have experienced some turbulence amidst the COVID-19 pandemic. In early March, the Organization of Petroleum Exporting Countries (OPEC) and non-member Russia were unable to come to an agreement on a production cut in response to the pandemic, sending Brent crude oil prices down to levels ($45/barrel) not seen at the time since 2017. Under further pressure to oil markets, the two parties announced a historic agreement on April 9, 2020, to cut nearly 10 million barrels per day of production through May and June before tapering the cuts to 8 million barrels per day for the remainder of the year.

EIA projects that West Texas Intermediate (WTI) crude oil will average $39/b in 2020 and $45/b in 2021. The Brent (North Sea) crude oil spot price is forecast to average $42/b and $49/b, 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.

U.S. Crude Oil and Midwest Gasoline Prices



Source: U.S. Energy Information Administration, Short-Term Energy Outlook October 2020,
Note: Gasoline prices are for regular unleaded, including taxes.