



# Michigan Energy Appraisal

## Winter Outlook 2021-2022

In compliance with MCL 460.6r

November 3, 2021

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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. After several publications of the Energy Appraisal which focused on the impacts of COVID-19 and the uncertainties for Michigan’s energy systems, this winter’s edition returns to providing short-term outlooks for energy supply and demand dynamics. Although COVID-19 still poses a risk to Michigan residents, there are signs of economic recovery and the return to more historical consumption patterns for energy products.

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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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.

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 Energy Appraisal via email, subscribe to the [listserv](#).

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## Executive Summary

A year and a half after the onset of COVID-19, the virus still presents a risk to residents in the state and across the country. Statewide, over 1.1 million confirmed cases of the virus have been documented as of this publication, and COVID-19 has claimed the lives of more than 22,000 Michiganders. However, with the development and roll-out of effective vaccines, there have 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. As Michiganders return to normal under the provisions of Governor Whitmer's "Vacc to Normal" plan, MPSC Staff continues to monitor the status of important home heating fuels as the winter season nears.

The core analyses in this winter'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:

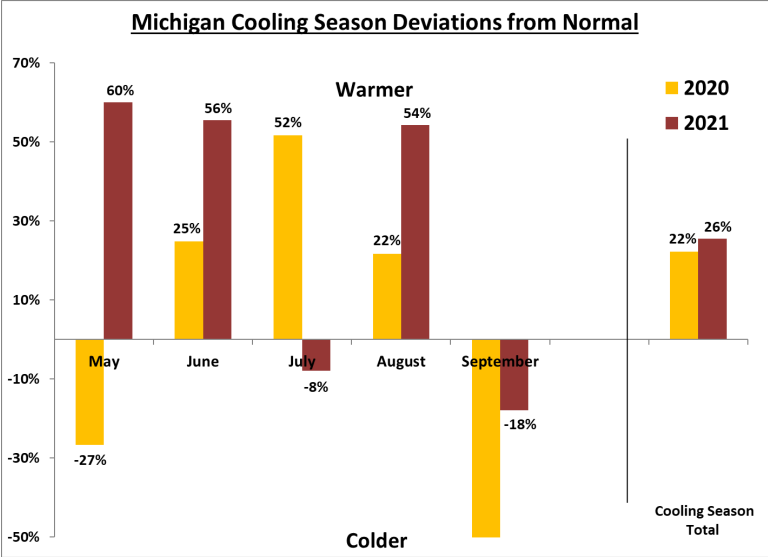
- Consumption of **natural gas** for all sectors is expected to see a 4 percent decrease in 2021, led by reduced demand from the electric power generation sector. Residential demand is expected to increase marginally by 1 percent.
- **Propane** consumption is projected to increase by 9.9 percent for 2021. The year-over-year increase is due to the low demand during the heating months of 2020. Propane usage on a seasonal heating basis (Nov.-Mar.) for 2021/22 is projected to increase by 9 percent when compared to 2020/21. Residential propane prices at the beginning of October averaged \$2.39/gallon, an increase of 80 cents compared to last year.
- Demand for **distillates** – the majority of which is diesel fuel – is projected to rebound, reaching 1.24 billion gallons for 2021. Michigan's industrial production index, an economic indicator used to measure output from the industrial sector, is expected to grow by 20 percent for 2021, increasing the demand for the fuel. No. 2 heating oil prices started the 2021/22 heating season \$1.24/gallon higher than last year at an average of \$3.10/gallon.
- **Electricity** sales are forecast to increase by about 3 percent in 2021. The largest increase is expected in the industrial sector (7.1 percent), with the commercial (3.1 percent) and residential (0.2 percent) sectors expected to rise as well. Residential electric rates edged up slightly, as customers of investor-owned utilities saw a median rate increase of 2.1 percent between October 2020 and October 2021.
- Demand for **motor gasoline** is expected to increase by 7.9 percent to 4.2 billion gallons in 2021. Midwest gasoline prices are expected to average \$2.86/gallon for 2021 and \$2.72 in 2022.

## Glossary

<b>Barrel</b>	A unit of volume equal to 42 U.S. gallons.
<b>b/d</b>	The abbreviation for barrel(s) per day, also displayed as bbl/d.
<b>Bcf</b>	The abbreviation for billion cubic feet.
<b>Brent</b>	Brent is a major trading classification of sweet light crude oil that serves as a major benchmark price for purchases of oil worldwide.
<b>CDD</b>	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.
<b>EIA</b>	Energy Information Administration - the statistical and analytical agency within the U.S. Department of Energy.
<b>GWh</b>	One billion watthours.
<b>GCR</b>	Gas Cost Recovery - the actual cost of natural gas that a local distribution company pays to purchase natural gas for your use.
<b>HDD</b>	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.
<b>LSE</b>	Load serving entity - a cooperative, municipal, investor-owned utility, or an alternative electric supplier (AES) that provides electricity to its customers.
<b>Mcf</b>	One thousand cubic feet.
<b>MISO</b>	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.
<b>mmBtu</b>	One million British thermal units.
<b>MW</b>	One million watts of electricity.
<b>OECD</b>	Organization for Economic Cooperation and Development - an intergovernmental economic organization with 35 member countries, founded in 1961 to stimulate economic progress and world trade.
<b>OPEC</b>	Organization of the Petroleum Exporting Countries
<b>PJM</b>	PJM – an RTO that coordinates the movement of wholesale electricity in all or parts of 13 states and the District of Columbia.
<b>STEO</b>	Short-Term Energy Outlook published monthly by EIA.
<b>WTI</b>	West Texas Intermediate (also known as Texas light sweet) – a grade of crude oil used as a benchmark in oil pricing.

# Data and Methodology

A vast majority of the predictive energy data (consumption, prices, and stocks) used in the models of this winter edition of the Michigan Energy Appraisal (Appraisal) are from EIA forecasts drawn from their Short-Term Energy Outlook (STEO). Energy supply and demand is often dependent upon weather-related variables. Therefore, variables such as heating and cooling degree days are also heavily used in the forecasts. Heating and cooling degree days are a commonly used metric for estimating building energy consumption. Deviations from “normal” degree day figures are helpful in understanding variations in consumption of energy commodities (see chart below). Future degree day deviations cannot be known at the time the appraisal forecasts are made, so assumptions are needed. For any model using degree day deviations, the assumption is made



that future weather conditions will be approximately “normal” and there will be no deviations from the historical average degree day figure calculated by the National Climatic Data Center at that given point in time during the forecast period.

Monthly data is used for all forecasts in this appraisal. However, certain variables used in the appraisal models are only reported or predicted on a quarterly basis from their respective source. Quarterly data leaves data gaps in

the monthly time series; therefore, extrapolation tools are needed. A cubic spline interpolation tool, used for curve fitting, is employed to acquire the approximate monthly data points in between the quarterly figures that were available for use in the models.

The forecast models used for the Appraisal are, for the most part, derived from EIA forecast models used in their preparation of the STEO. More specifically, these forecast models are called ARIMA (Auto Regressive Integrated Moving Average) models. ARIMA models are an econometric tool used by analysts to better understand the relationship between variables, or to predict future points in a time series. The auto regressive and moving average portions of the model mean that past observations and past forecast errors are used in prediction of future observations. The integrated portion of the model means that a transformation was applied to the data for statistical purposes.

Forecast models are frequently evaluated and updated in order to provide as accurate information as possible so that future energy expectations can be built. However, given that the forecasting models used in this appraisal partly use predictions, extrapolated data, and assumptions of normal weather, the potential does exist for the forecasted value at a given point in time to vary from actual observed values for the same point in time.

## Trending Topics

### Petroleum and Natural Gas Prices

As the effects of COVID-19 slowed the U.S. economy, demand for crude oil and refined petroleum products like gasoline, diesel, and jet fuel declined significantly. These declines resulted in a slowdown of crude oil production and a reduction in refining capacity. With the introduction of COVID-19 vaccinations, the U.S. economy started its return to more normal conditions and demand for petroleum products has increased – so much so that existing supplies were drawn down at a faster rate than producers were able to maintain. Production was further hampered by two significant events in 2021 which led to damaged refining, production, and distribution infrastructure in Texas and along the Gulf Coast due to extreme winter weather and Hurricane Ida, respectively. This has caused the price of crude oil, refined petroleum products, and natural gas (often produced alongside crude oil) to strengthen in recent months. Increased prices are not viewed as a long-term trend, as crude oil suppliers are expected to bring more supply to markets which will help to moderate prices.

Michigan, with its large natural gas storage assets, is well positioned for the upcoming winter. Michigan natural gas utilities get approximately 50 percent of their winter gas needs from in-state storage and commonly hedge price fluctuations by purchasing a portion of their natural gas needs well in advance. This reliance and access to in-state storage should help to insulate Michigan residents from potential spikes in natural gas prices this winter.

### MPSC Technical Conference (Case No. U-21122)

On August 25, 2021, the MPSC opened Case No. U-21122 in response to a series of severe storms from August 10<sup>th</sup>-12<sup>th</sup> that left more than 1 million residents without power for an extended period. Case No. U-21122 will expand the data the Commission receives from utilities about their efforts to improve reliability, support more transparency around planning, and encourage more engagement in how best to prepare and harden Michigan's electric distribution system. On October 4, 2021, the MPSC announced details regarding a technical conference on emergency preparedness, distribution reliability, and storm response. The two-day conference (Oct. 22, 2021 & Nov. 5, 2021) was designed to gather updated information for the Commission to determine next steps it may take in addressing the power outages over the summer. See the [Technical Conference webpage](#) for additional information.

### 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. See [michigan.gov/MPSCLine5](http://michigan.gov/MPSCLine5) for more information on the status of this case.



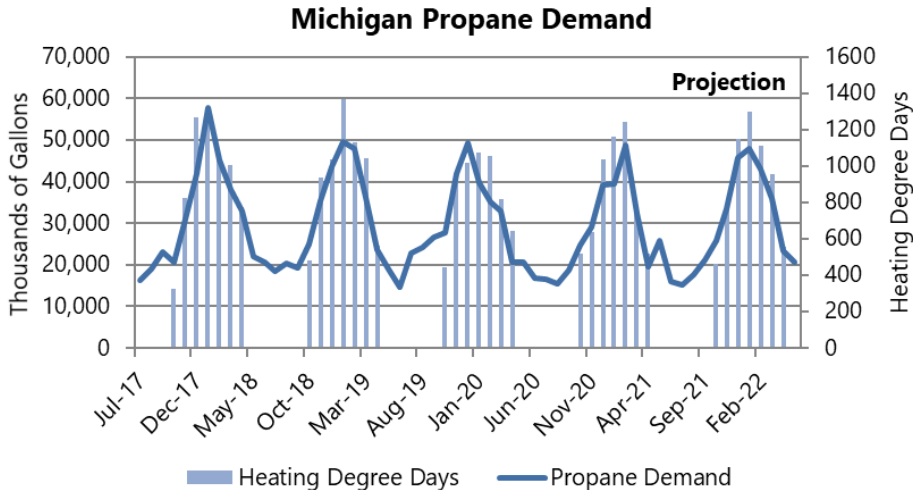
# Propane

## Demand

Propane usage in Michigan is projected to increase by about 9.9 percent for 2021 compared to 2020, assuming normal winter weather through the remainder of the year. This sizeable yearly increase is primarily due to unusually low demand in 2020 when warmer than normal temperatures were experienced during the heating months. Propane usage on a seasonal heating basis (Nov.-Mar.) for 2021/22 is projected to increase by 9 percent when compared to 2020/21.

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) indicate Michigan may experience slightly above normal temperatures throughout the 2021/22 winter heating season, totaling 5,284, 0.7 percent lower than the 1981-2010 normal of 5,321 HDD units.

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 24, 2021, many Midwestern states including Michigan, Iowa, Illinois, and Minnesota were showing corn maturity progress ahead of the five-year average – an indication there may be reduced propane demand for grain drying this fall.

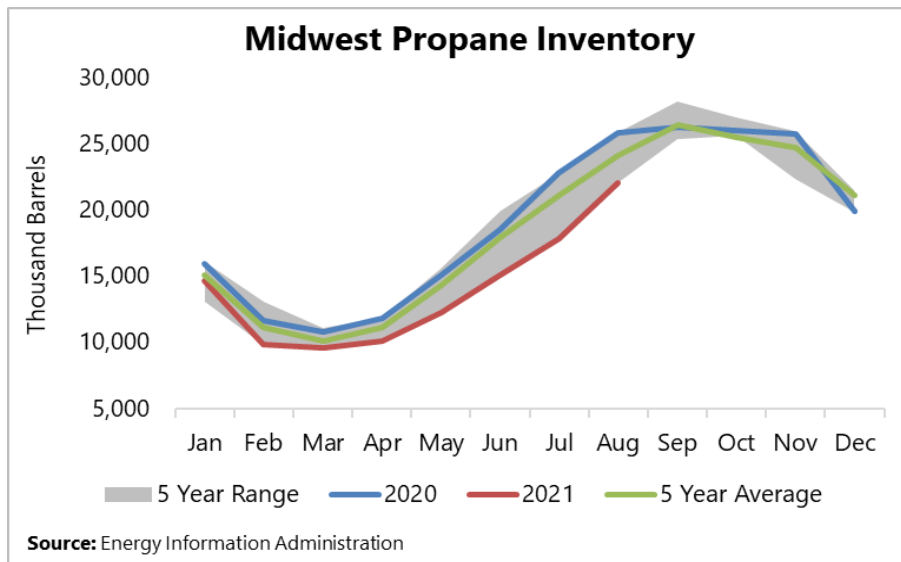


Source: Energy Information Administration

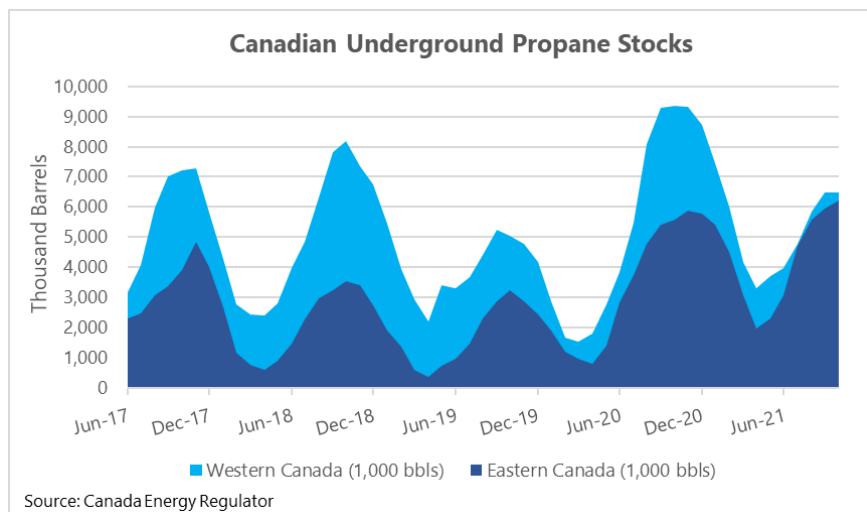
## Supply

U.S. propane production remains high – averaging 2.35 million b/d to begin October as propane export demand continues to be strong. The four-week average Midwest propane production for the week ending October 22, 2021, was 488,000 b/d, an increase of 10.6 percent from the same period last year.

According to the EIA, U.S. inventories of propane and propylene stood at 75.6 million barrels as of October 22, 23 percent below levels seen at the same time last year. PADD 2 (Midwest) propane and propylene stocks totaled 25 million barrels as of October 22 (down 909 thousand barrels from 2020), 3.5 percent below the five-year average for this time of the year.

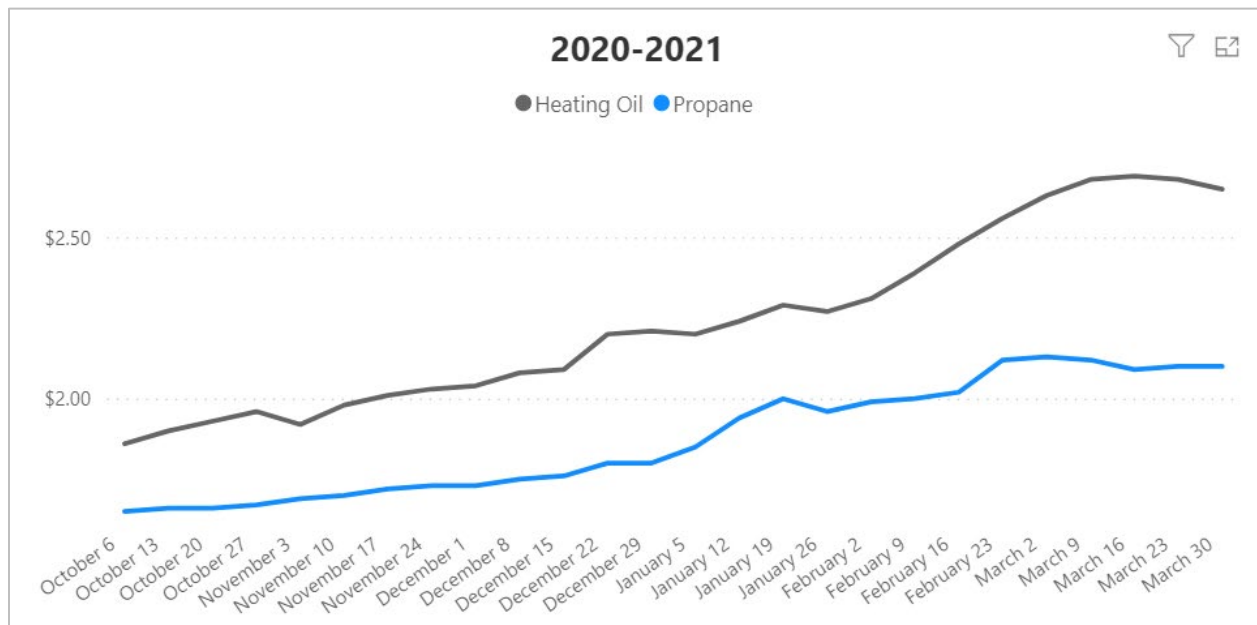


In addition to domestic propane supply, many regions of the U.S. rely on supplies from Canada that are transported by pipeline, rail, and truck. Major Canadian underground storage facilities are primarily located in western Canada (Alberta) and in eastern Canada (Ontario). According to the MPSC's Statewide 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 October totaled 6.2 million barrels in eastern Canada, and 6.5 million barrels in western Canada. For eastern Canada, propane stocks are 46 percent above five-year averages and approximately 11 percent higher than last year, while for western Canada stocks are 10 percent below the five-year average and about 31 percent lower than last year.



## Price

Retail propane prices rose steadily during the winter of 2020/21, starting the heating season at \$1.65 per gallon and peaking at \$2.13 per gallon. The average price of propane between October and March was \$1.78 per gallon in Michigan, an increase of about 10 cents per gallon from the survey period in 2019/20.



Source: [https://www.michigan.gov/mpsc/0,9535,7-395-93308\\_93325\\_93424---,00.html](https://www.michigan.gov/mpsc/0,9535,7-395-93308_93325_93424---,00.html)

According to the EIA, wholesale propane prices in Michigan started this heating season at \$1.56 per gallon (97 cents higher than prior year), an indication of tighter supply. Higher oil and natural gas prices, which feed into propane prices, will likely lead to an increase in prices paid for propane this winter. For the week of October 25, 2021, the average residential propane price in Michigan was around \$2.46 per gallon, \$0.79/gallon higher than a year ago.

**Michigan Propane Sales Projection**  
(Millions of Gallons)

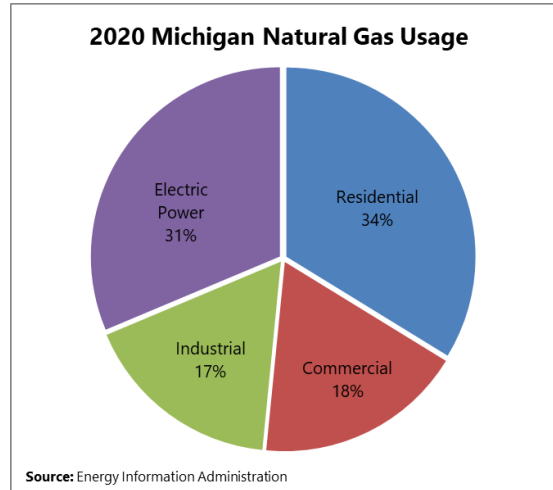
			Total Demand	Historical (prior year)	% Change
Historical	2018	Total	378.4	328.7	15.1%
	2019	Total	383.5	378.4	1.3%
	2020	Total	309.7	383.5	-19.2%
	2021	January	39.4	39.8	
		February	48.7	35.1	
		March	32.5	33.0	
		April	19.6	20.5	
		May	25.7	20.6	
		June	15.9	16.8	
		July	15.2	16.5	
Projection		August	17.6	15.5	
		September	21.2	18.8	
		October	25.7	24.7	
		November	33.3	29.2	
		December	45.6	39.2	
	2021	Total	340.4	309.7	
		<b>2020-2021 Change</b>	<b>9.9%</b>		
	2022	January	48.0	39.4	
		February	43.1	48.7	
		March	35.9	32.5	
		April	23.3	19.6	
		May	20.6	25.7	

NOTES: Projected demand assumes normal weather for the remainder of the year  
SOURCES: Historical Data -- Energy Information Administration, U.S. Department of Energy  
Projection -- Energy Security Section, MPSC

# Natural Gas

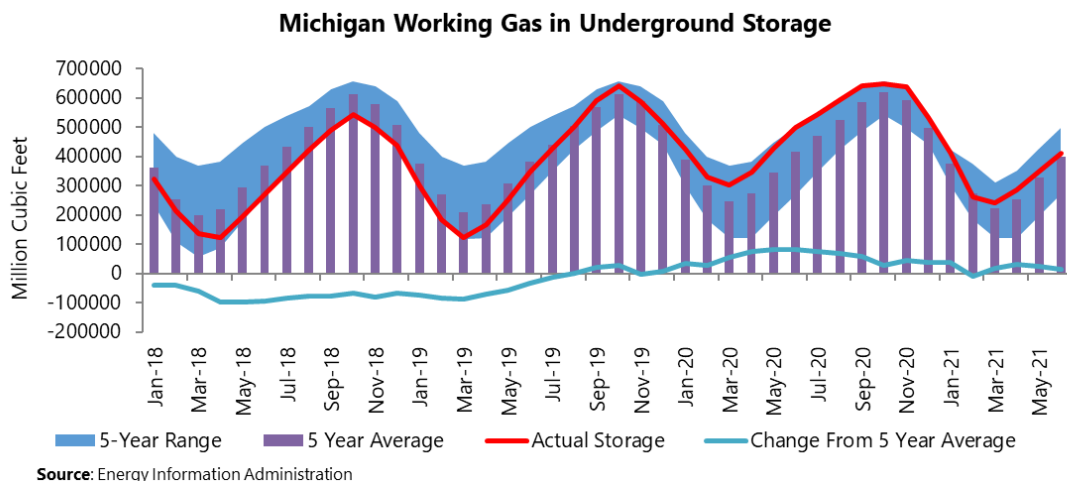
## Demand

Assuming normal winter weather through the 2021/22 heating season, total natural gas sales in Michigan from all sectors are projected to decrease by 4 percent in 2021 to 879.2 billion cubic feet (Bcf). However, should Michigan experience a colder than normal winter, usage for space heating could increase and boost demand. Lower total natural gas sales for 2021 are driven primarily by a decrease in demand from the electric power generation sector. The electric power generation sectors' consumption of natural gas is expected to decline 20.2 percent for 2021 – which isn't viewed as a major market trend away from the fuel, but rather from the effects of mild winter months to start 2021, increases in natural gas prices, and the expectation of normal temperatures for the remainder of the year. Residential natural gas consumption – where it is used to heat about 77 percent of Michigan households – is estimated to rise by 1 percent.



## Supply

Storage levels in Michigan are projected to be 477 Bcf to end 2021, which is 10.6 percent lower than the previous year's end. Michigan has over 10 percent of the nation's available underground storage capacity for natural gas, the largest of any state. Working gas storage inventories for the lower 48 states were 3,548 Bcf for the week ending October 22, 2021, 10 percent lower than the same time last year and 3.6 percent lower than the five-year average. 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. 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.



## Price

EIA forecasted residential natural gas prices for the Midwest this coming winter are noticeably higher than the previous winter at \$11.28/Mcf, an increase of 44 percent from last season. The wholesale (commodity) price for winter '21-22 natural gas, determined by futures trading on the Chicago Mercantile Exchange (CME) averaged approximately \$3.75/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 \$5.79/Mcf demonstrating the steady rise in prices as winter approaches.

The EIA's October STEO projects Henry Hub natural gas spot prices to average \$5.80/Mcf for the 4th quarter 2021 with prices rising to an average of \$5.90 for the deep winter months of January and February 2022. The EIA's projected prices reflect the current and projected tightness of supply and demand with producers not increasing production much in response to higher pricing, whereas marketers are shipping LNG to Asia and Europe where hefty profits are being made. The usual seasonal demand increases, and the growing LNG exports will draw down natural gas inventories and keep the market tight throughout the upcoming winter.

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 alone) for residential customers of regulated utilities in Michigan during the November 2021 through March 2022 winter is currently \$3.76/Mcf compared to last year's actual average of \$2.53/Mcf.

	Cost Breakdown (per Mcf)			Customer Charge (monthly)	Nov. 2021 - March 2022 Bill Forecast
	Commodity Charge	Distribution	Total Average Cost		
<b>Four Largest Gas Utilities</b>	\$3.65	\$4.17	\$7.82	\$12.64	\$696

Note: commodity charge refers to the price of fuel based on October 2021 average; November 2021 - March 2022 usage is estimated at 81 Mcf.

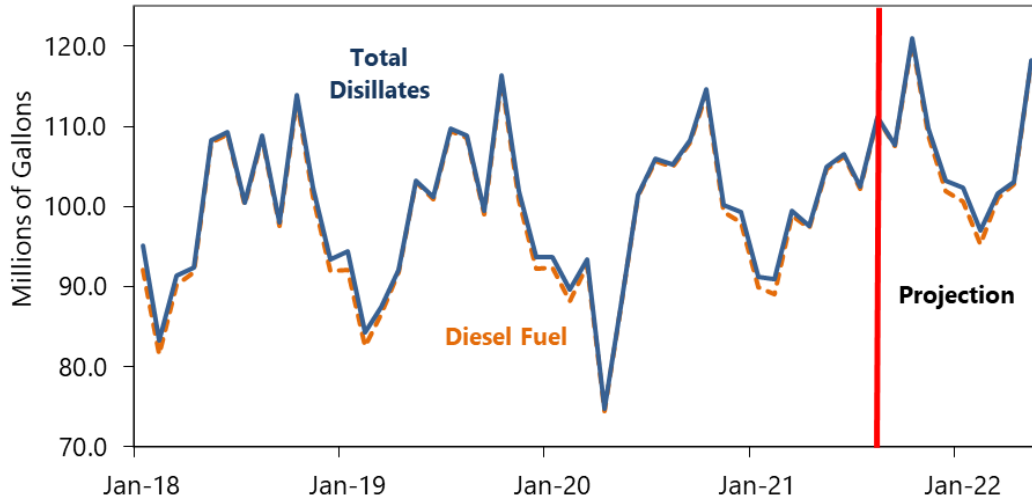
## Distillate Fuels

### Demand

Total distillate sales in Michigan are projected to increase by 6.1 percent for 2021, to 1.24 billion gallons as economic activity rebounds following COVID-19 restrictions. Ultra-low sulfur diesel fuel accounts for approximately 99% of total distillate demand, a majority being used for transportation by highway trucks, with the remainder consisting of heating oil, kerosene, and No. 1 distillate. Other users of distillates, although less prominent, include the agriculture, commercial, and industrial sectors, as well as vessel fueling. If expectations come to fruition, 2021 will mark the first annual increase in distillate sales since 2018. Distillate demand was negatively affected by COVID-19 throughout 2020, declining 1.6 percent for the year, but due to the various uses of the fuel to transport consumer goods and supplies to combat the COVID-19 pandemic, demand for the fuel did not decline as dramatically as motor gasoline.

Distillate fuels continue to decline as a primary fuel source for home heating in Michigan. According to estimates from the U.S. Census Bureau’s American Community Survey, approximately 42,597 households heated their homes with the fuel in 2019 – compared to 76,879 households in 2010. Distillate fuel continues to be a prevalent home heating fuel source in areas of the Northeastern U.S.

### Michigan Distillate Fuel Oil Sales



Source: Historical data - Energy Information Administration

#### Supply

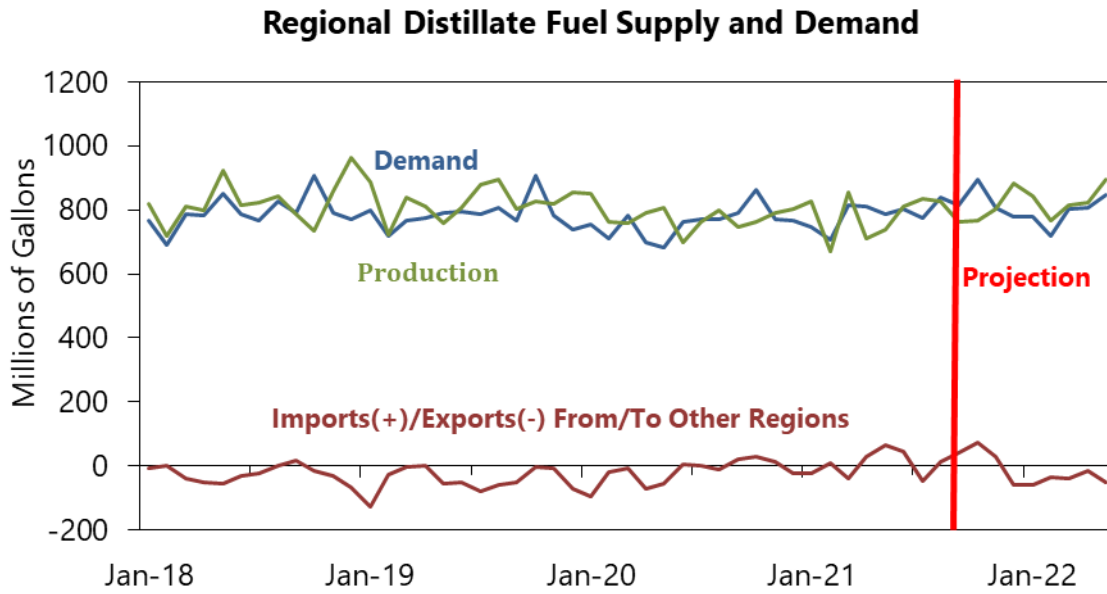
Regional refineries are expected to produce an average of 790 million gallons of distillate fuel oil per month in 2021, an increase of 1.6 percent from 2020 averages. For the week ending October 22, national inventories of distillate oil were 125 million barrels, about 31 million barrels below this same time of last year. Midwest inventories for the same week totaled 30 million barrels, 2 million barrels higher than a year ago. Lower year over year inventories at the national level are likely a result of increased demand following a period of relatively low refinery utilization due to the onset of COVID-19. U.S. refinery utilization in 2020 was 78.9 percent, compared to the previous five-year average of 91 percent.

#### Price

Nationally, the EIA expects retail prices for on-highway diesel fuel will average \$3.24 per gallon for 2021, an increase of 69 cents from 2020. However, it is expected that distillate prices will pull back slightly for 2022, with prices estimated to average \$3.23 per gallon. According to AAA Michigan, the average price of diesel in Michigan was \$3.53 per gallon on November 1, \$1.17 per gallon higher than the price seen at this time last year.

The average cost of No. 2 heating oil in Michigan was \$3.19 on October 25, 2021, \$1.23 per gallon higher than the cost at the same time last year. The principal price driver for heating oil is the U.S. refiner acquisition cost of crude oil, which averaged about 29 dollars more per barrel compared to the start of the 2020/21 heating season. Other factors affecting the price of

heating oil include the seasonality of demand from weather conditions, competition in local markets, and regional operating costs.



Source: Historical data - Energy Information Administration



## Michigan Distillate Fuel Oil Sales Projection

(Millions of Gallons)

			Diesel	Total	Prior	
			Fuel	Distillate	Year	% Change
Historical	2018	Total	1,185.4	1,196.7	1,181.2	1.3%
	2019	Total	1,182.8	1,192.8	1,196.7	-0.3%
	2020	Total	1,166.5	1,174.0	1,192.8	-1.6%
	2021	January	89.9	91.3	93.8	
		February	89.1	91.0	89.6	
		March	98.9	99.5	93.4	
		April	97.3	97.5	74.7	
		May	104.7	104.9	87.5	
		June	106.2	106.5	101.5	
Projection		July	102.2	102.4	105.9	
		August	111.1	111.2	105.3	
		September	107.5	107.7	108.3	
		October	120.5	121.0	114.7	
		November	108.8	109.7	100.2	
		December	101.9	103.3	99.3	
		2021	Total	1,238.1	1,246.0	1,174.0
	<b>2020-2021 Change</b>		<b>6.1%</b>	<b>6.1%</b>		
	2022	January	100.7	102.3	91.3	
		February	95.2	97.0	91.0	
		March	101.1	101.7	99.5	
		April	102.9	103.1	97.5	
		May	118.2	118.3	104.9	

NOTES: These projections assume normal heating degree day accumulations for the remainder of the year.  
 SOURCES: Historical data -- Energy Information Administration, DOE. Projections -- Energy Security Section, MPSC.

## Regional Distillate Fuel Oil Supply and Demand

(Millions of Gallons)

			Production	Inventories	Demand
Historical	2021	January	825.7	531.6	746.3
		February	670.3	506.5	705.3
		March	854.2	508.1	813.1
		April	710.3	435.2	810.8
		May	737.9	451.7	787.5
		June	811.1	507.4	801.5
	Projection	July	833.6	518.1	775.5
		August	827.4	518.7	839.2
		September	760.7	507.7	813.0
		October	767.6	450.7	896.6
		November	800.9	472.3	806.4
		December	883.2	519.4	777.5
		Monthly Average	790.2	493.9	797.7
2022	January	842.7	523.5	780.5	
	February	768.6	537.4	718.7	
	March	813.6	510.0	802.6	
	April	824.5	511.8	806.1	
	May	896.0	510.0	845.4	

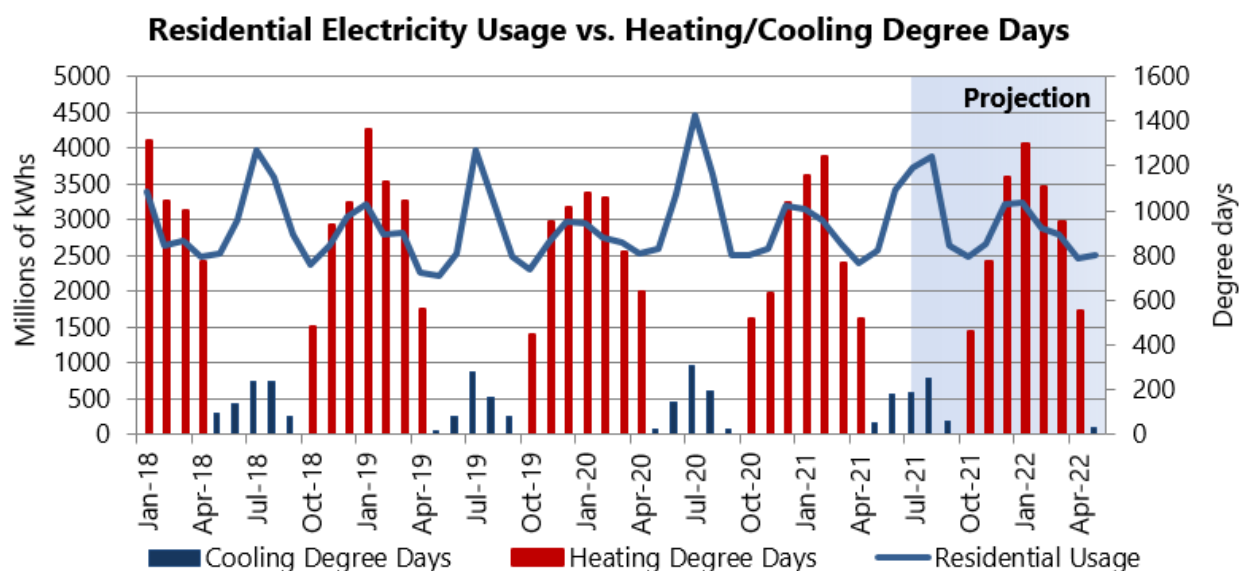
NOTES: Production projections based on expected refinery capacity utilization, recent trends, and normal weather.

SOURCES: Historical data -- Energy Information Administration, DOE; Projection -- Energy Security Section, MPSC.

# Electricity

## Demand<sup>1</sup>

Assuming normal weather, Michigan’s total electric sales for 2021 are projected to increase 3.1 percent to 99.09 thousand GWh compared to 96.15 thousand GWh in 2020. The increase in sales is expected to come from all sectors including residential (0.2%), commercial (3.1%), and industrial (7.1%). Two of the primary drivers of electricity consumption in the residential market is for cooling during hot weather and home heating during the winter. Summer 2021 had 26 percent more cooling degree days than historical averages – indicating an overall warmer than normal summer. Industrial sector usage of electricity, which is less dependent on weather fluctuations and more highly correlated to economic activity, declined by 16% in 2020 due to the economic impact of COVID-19, but is expected to rebound by 7.1 percent for 2021.



Source: National Climate Data Center & Energy Information Administration

Michigan’s combined coincident peak electrical demand, for both the Consumers Energy and DTE Electric service areas this summer was 17,707 megawatts (MW). Consumers Energy’s bundled peak electric demand this summer was 7,370 MW and occurred on August 24, 2021. DTE Electric’s bundled peak demand was 10,337 MW and was on July 9, 2021.

## Supply

On June 10, 2021, the Midcontinent Independent System Operator (MISO) declared a maximum generation emergency event due to unplanned outages, high temperatures, and increased demand. As a result of this event, both Consumers Energy and DTE requested that customers on interruptible rate programs reduce their demand in accordance with the terms of those programs. This winter, no supply shortages or transmission constraints are expected to affect the ability of Michigan utilities to meet peak electric demand. In addition to power that they generate, Michigan utilities can purchase electricity supply from wholesale markets administered by MISO and PJM as needed.

<sup>1</sup> Demand in this section refers to electricity sales – not demand from a capacity perspective.

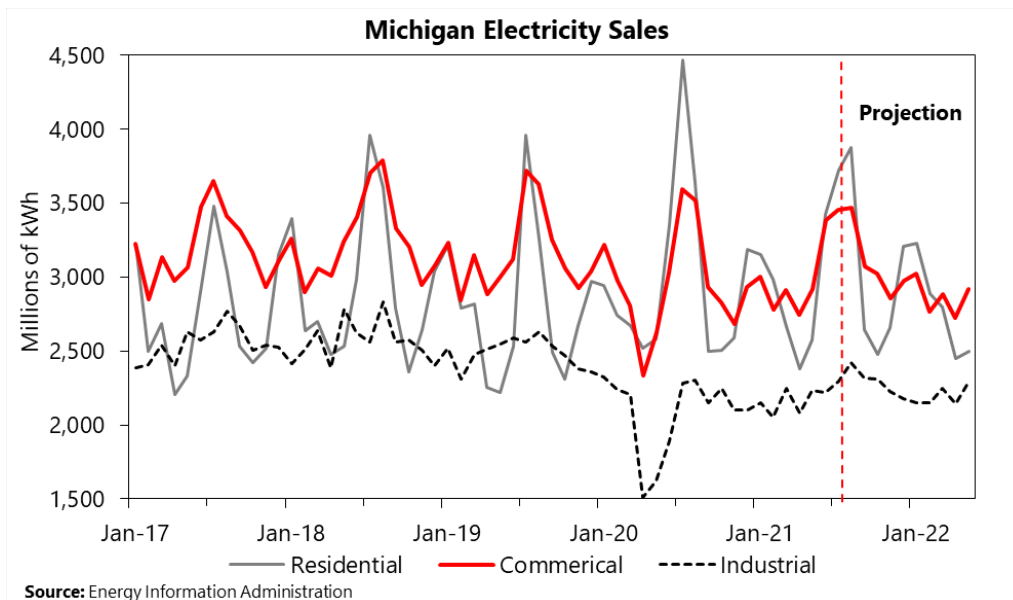
## Price

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 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.

### Michigan Electric Rate Comparison

	2020		2021		Percent Change
	Monthly Bill	¢/kWh	Monthly Bill	¢/kWh	
<b>INVESTOR OWNED</b>					
AEP (I&M) Combined	\$85.01	17.00	86.01	17.20	1.2%
Alpena Power	\$66.44	13.29	68.75	13.75	3.5%
Consumers Energy	\$79.06	15.81	93.29	18.66	18.0%
DTE Electric	\$89.32	17.86	90.27	18.05	1.1%
Northern States Power	\$64.97	12.99	67.99	13.60	4.6%
UMERC - (FORMERLY WEPCO)	\$77.11	15.42	74.87	14.97	-2.9%
UMERC - (FORMERLY WPS)	\$72.39	14.48	67.71	13.54	-6.5%
Upper Peninsula Power	\$108.37	21.67	111.55	22.31	2.9%
<b>COOPERATIVE</b>					
Alger Delta	\$101.51	20.30	\$102.42	20.48	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	\$88.85	17.77	\$88.11	17.62	-0.8%
Homeworks Tri-County	\$87.62	17.52	\$90.44	18.09	3.2%
Midwest	\$92.32	18.46	\$95.60	19.12	3.6%
Presque Isle	\$74.65	14.93	\$77.39	15.48	3.7%
Thumb	\$76.90	15.38	\$82.01	16.40	6.6%
<b>MUNICIPAL</b>					
Holland Board of Public Works	\$70.58	14.12	\$60.25	12.05	-14.6%
Lansing Board of Water and Light	\$83.38	16.68	\$83.39	16.68	0.0%

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



**Michigan Electricity Sales Projection**  
(Millions of kWh)

		Residential	Commercial	Industrial	Total
<b>Historical</b>	2018 Total	35,129	38,925	30,805	104,859
	2019 Total	33,496	37,862	29,886	101,244
	2020 Total	35,695	35,491	24,972	96,158
	2021 January	3,149	3,001	2,153	8,303
	February	2,983	2,779	2,056	7,818
	March	2,666	2,911	2,248	7,825
	April	2,382	2,743	2,083	7,208
	May	2,575	2,920	2,231	7,726
<b>Projection</b>	June	3,422	3,388	2,218	9,028
	July	3,723	3,453	2,297	9,474
	August	3,874	3,466	2,420	9,759
	September	2,642	3,074	2,319	8,035
	October	2,478	3,026	2,313	7,817
	November	2,657	2,854	2,223	7,735
	December	3,211	2,977	2,176	8,364
	2021 Total	35,762	36,592	26,737	99,091
<b>2020-2021 change</b>	<b>0.2%</b>	<b>3.1%</b>	<b>7.1%</b>	<b>3.1%</b>	
2022	January	3,229	3,026	2,151	8,405
	February	2,885	2,763	2,150	7,798
	March	2,794	2,888	2,249	7,931
	April	2,450	2,727	2,143	7,320
	May	2,500	2,917	2,299	7,716

NOTE: Projected electricity sales are based on historical trends.

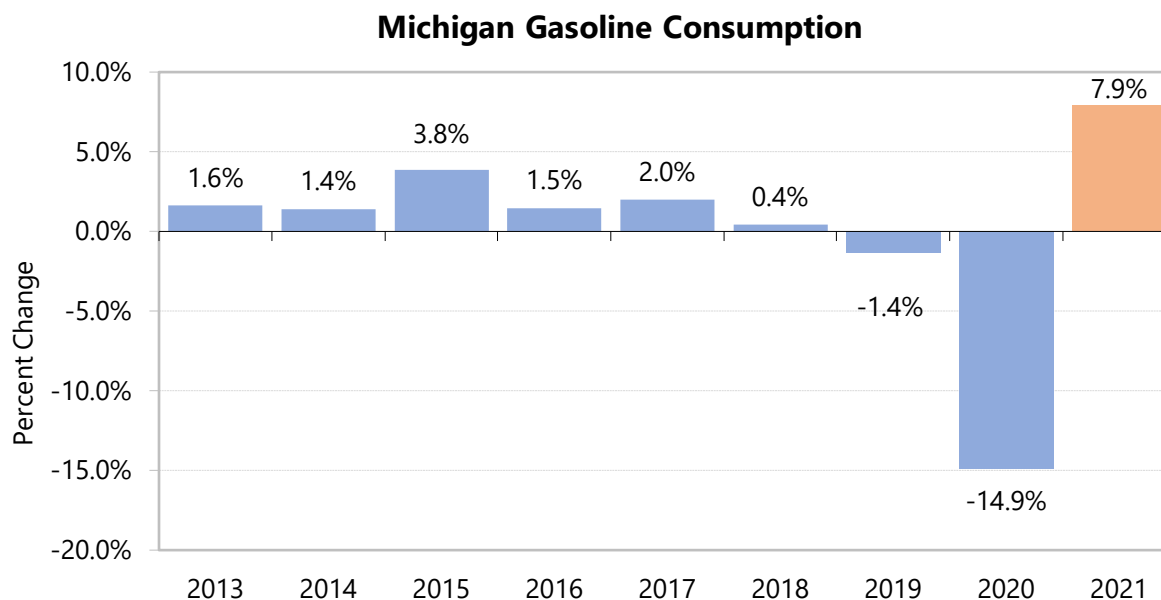
SOURCES: Historical Data – Energy Information Administration (EIA), U.S Department of Energy.

Projection: Energy Security Section, MPSC, using primarily EIA data (see methodology section for additional detail).

## Motor Gasoline

### Demand

Gasoline demand in Michigan is projected to increase 7.9 percent to 4.2 billion gallons for 2021, following a dramatic 14.9 percent decline in 2020. The sizeable decline in gasoline demand in 2020 can be attributed to the effect COVID-19 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. With the easing of restrictions and the broad availability of COVID-19 vaccinations, gasoline demand has grown throughout 2021, although not quite yet to pre-pandemic levels. Future increases in motor gasoline demand will likely depend upon the comfort level of consumers with traveling.



Source: Energy Information Administration

### Supply

Regional average monthly gasoline production is projected to increase by 7.8 percent for 2021. Refinery utilization rates for the Midwest through the first four months of the year averaged 83.9 percent but increased to 92 percent throughout the summer driving season. Average monthly inventories for the region<sup>2</sup> are expected to decline by 41.8 percent in 2021 as demand growth outpaces production growth. As of October 22, the PADD 2 region<sup>3</sup> held 45.4 million barrels of gasoline inventories, 2.8 million barrels below this same time last year when gasoline demand was much lower. See Regional Gasoline Supply and Demand table on page 21 for additional detail.

### Price

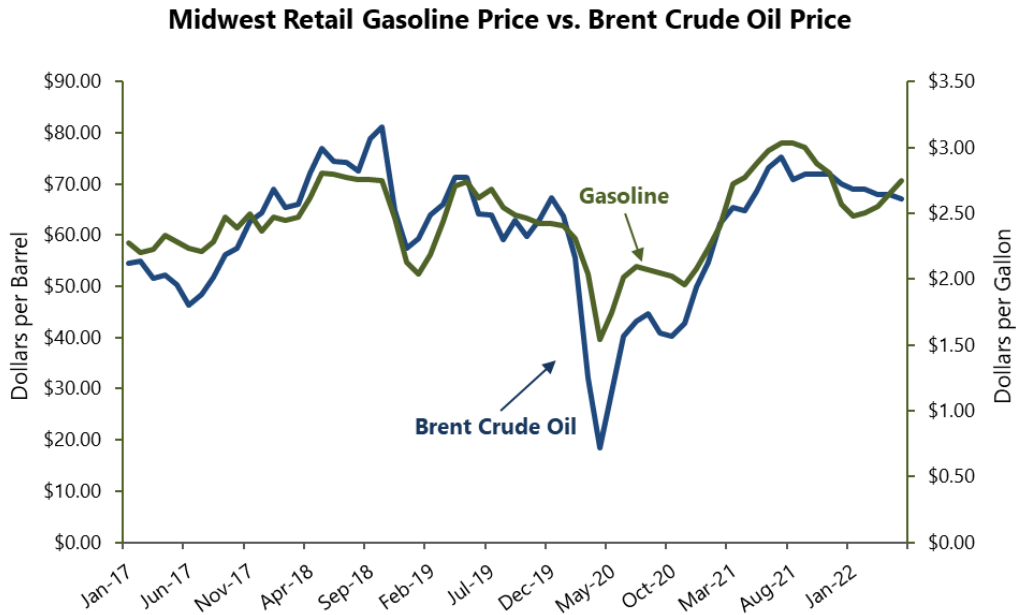
According to AAA Michigan, the average price for a gallon of regular unleaded gasoline in Michigan on November 1, 2021, was \$3.26 compared to \$2.04 a year ago. Michigan motorists

<sup>2</sup> The region is comprised of Illinois, Indiana, Kentucky, Michigan, Tennessee, and Ohio.

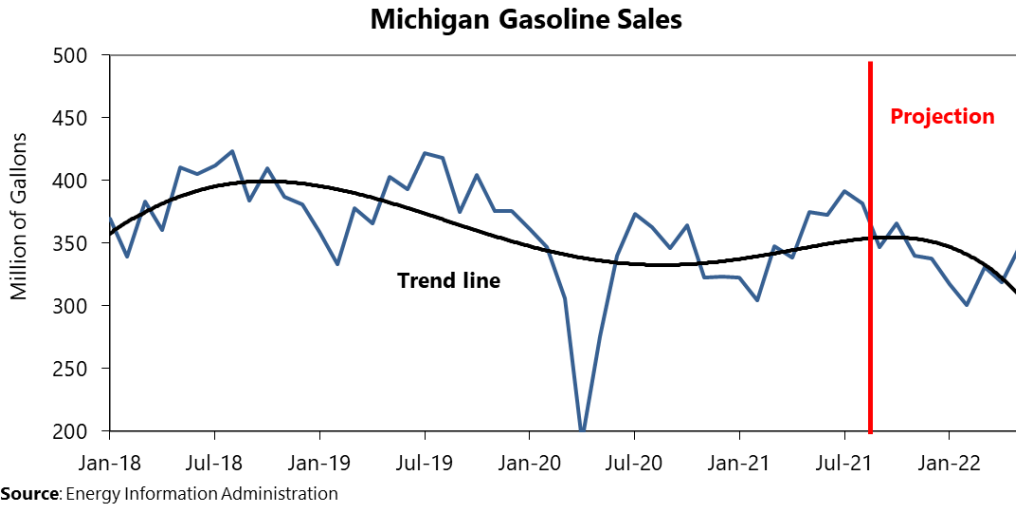
<sup>3</sup> PADD 2 region comprised of Michigan, Ohio, Indiana, Kentucky, Tennessee, Illinois, Wisconsin, Missouri, Iowa, Minnesota, North Dakota, South Dakota, Nebraska, Kansas, and Oklahoma.

should expect to see an increase in gasoline prices to start 2022. 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.

The EIA expects Midwest retail regular grade gasoline prices to average \$2.86/gal for 2021 and \$2.72/gal in 2022. Higher crude oil prices relative to last year are a driving factor for higher prices seen at the pump. The EIA projects Brent crude oil to average \$71.38/barrel for 2021, compared to only \$41.69/barrel seen in 2020.



Source: Energy Information Administration



### Michigan Gasoline Sales Projections

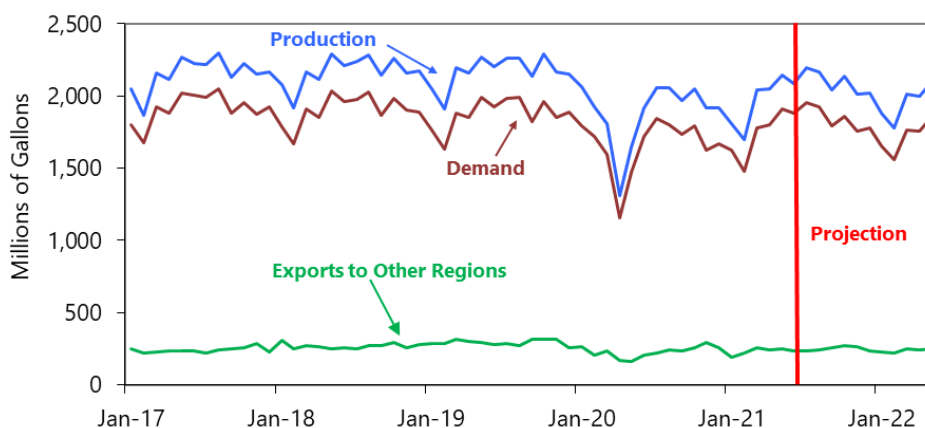
(Millions of Gallons)

			Total	Historical		
			All Grades	(prior year)	% Change	
Historical	2018	Total	4,663.1	4,643.3	0.4%	
		2019	Total	4,599.9	4,663.1	-1.4%
			Total	3,913.2	4,599.9	-14.9%
	2021	January	322.9	360.9		
		February	304.5	346.5		
		March	347.4	305.9		
		April	338.4	192.1		
		May	374.6	275.4		
		June	372.4	339.7		
Projection	July	391.4	373.2			
	August	381.4	362.9			
	September	346.6	346.1			
	October	365.6	364.5			
	November	339.6	322.3			
	December	338.0	323.6			
	2021	Total	4,222.9	3,913.2	7.9%	
<b>2020-2021 Change</b>			<b>7.9%</b>			
2022	January	317.1	322.9			
	February	300.5	304.5			
	March	330.5	347.4			
	April	318.4	338.4			
	May	347.5	374.6			

SOURCE: Historical data - Energy Information Administration, U.S. Department of Energy.  
Projections – Energy Security Section, MPSC.



### Regional Gasoline Supply and Demand



Source: Historical data - Energy Information Administration

### Regional Gasoline Supply and Demand

(Millions of Gallons)

			Production	Inventories	Demand
Historical	2018	Monthly Average	2,170.2	88.9	1,903.5
	2019	Monthly Average	2,171.2	80.2	1,878.7
	2020	Monthly Average	1,886.6	81.0	1,659.8
	2021	January	1,807.8	72.7	1,623.8
		February	1,694.5	67.5	1,478.2
		March	2,042.3	68.5	1,781.7
		April	2,046.2	71.7	1,798.8
		May	2,147.7	60.8	1,912.5
	June	2,087.6	32.9	1,877.6	
Projection	July	2,195.6	38.0	1,956.3	
	August	2,165.4	35.3	1,923.2	
	September	2,041.0	32.6	1,790.0	
	October	2,133.5	31.0	1,861.6	
	November	2,015.1	27.7	1,753.0	
	December	2,018.1	26.7	1,781.4	
		2021 Monthly Average	2,032.9	47.1	1,794.8
<b>2020-2021 Change</b>			<b>7.8%</b>	<b>-41.8%</b>	<b>8.1%</b>
2022	January	1,879.2	24.3	1,653.0	
	February	1,779.9	22.0	1,559.0	
	March	2,010.9	18.6	1,767.0	
	April	2,000.3	17.0	1,756.7	
	May	2,103.9	15.4	1,859.1	

NOTE: Production projections are based on refinery utilizations and recent trends.

SOURCE: Historical data - Energy Information Administration, U.S. Department of Energy.

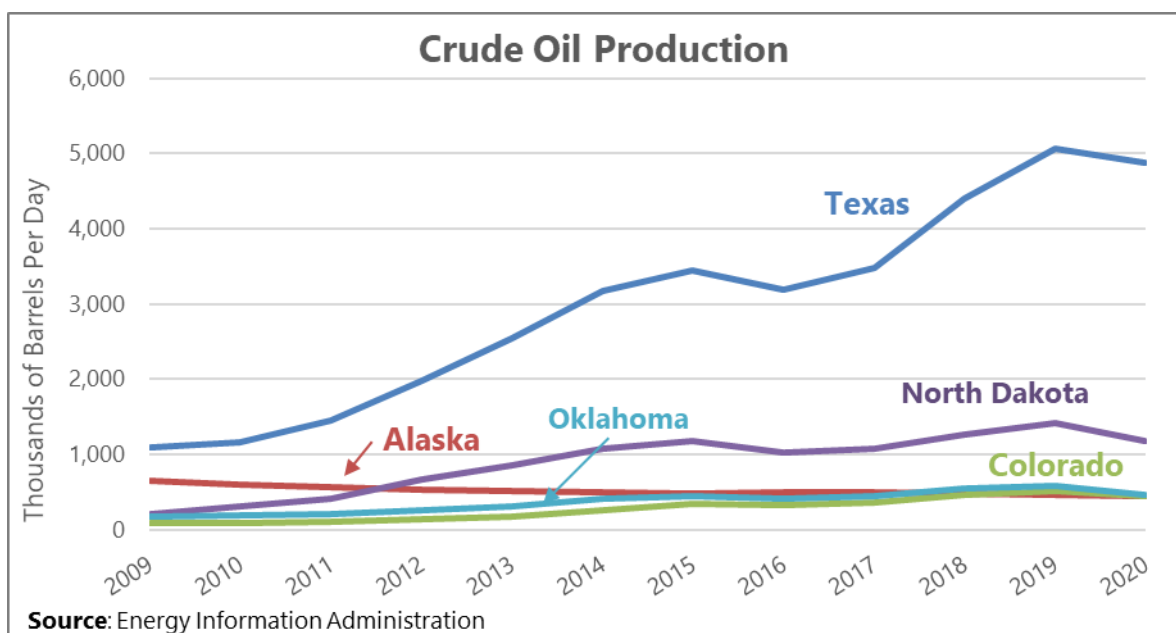
Projections – Energy Security Section, MPSC.

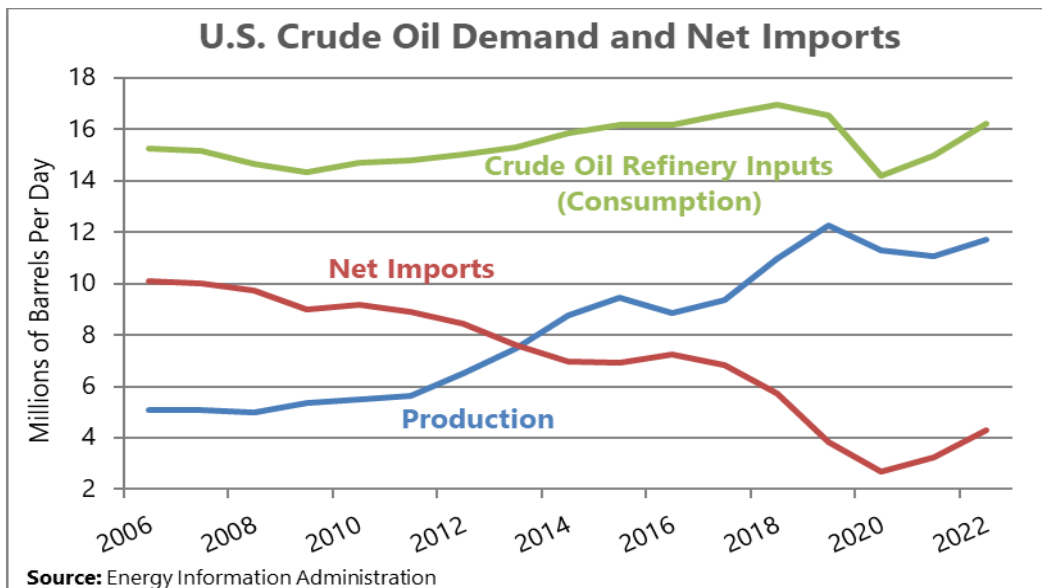
# Petroleum

## U.S. Outlook

The EIA's October Short Term Energy Outlook (STEO) revised U.S. crude oil production figures downward slightly from just a month ago. U.S. crude oil production averaged 11.3 million b/d in 2020 and is expected to decrease to 11.02 million b/d for 2021 and up to 11.73 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 through 2021 and current spot prices reside at \$84/barrel for WTI and Brent.

U.S. crude oil stocks currently reside 62 million barrels lower than a year ago, when stocks built to near record highs as the effects of COVID-19 set in. As of October 22, 2021, the U.S. had 430.8 million barrels in inventory (12.5% decline relative to 2020) which stands near the bottom of the five-year range for this time of year. U.S. crude oil exports have declined recently, with the four-week average ending October 22, 2021, standing at 2.79 million barrels per day – down from this year's high of 3.47 million b/d in July.



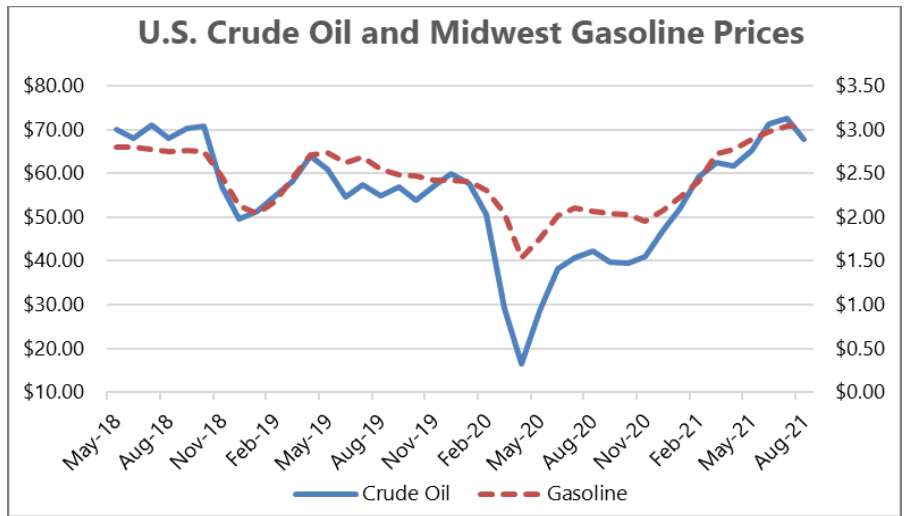


### World Outlook

The EIA October STEO reports that global petroleum consumption will increase by 5.05 million b/d in 2021 and again rise by 3.48 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 1.67 million b/d in 2021 and further grow 5.46 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 July, the Organization of Petroleum Exporting Countries (OPEC) and non-member Russia announced they had agreed to increase output by 400,000 b/d. Amidst increasing petroleum prices in September, OPEC again agreed to increase production through November 2021, but stopped short of announcing further increases beyond that point.

EIA projects that West Texas Intermediate (WTI) crude oil will average \$68.48/bbl for 2021 and \$68.24/bbl in 2022. The Brent (North Sea) crude oil spot price is forecast to average \$71.38/bbl and \$71.91/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 September 2021,  
 Note: Gasoline prices are for regular unleaded, including taxes.

## Michigan Household Winter Heating Fuel Summary

The Winter Heating Fuel Summary depicts what a typical Michigan household is projected to consume and spend on their primary heating fuel during the 2021-2022 winter heating season. Actual usage for any given home will depend on a number of factors, including the relative energy efficiency of the home, the home's location and size, the occupants' individual heating preferences, and the number of heating units or appliances in the home.

### Michigan Household Winter Heating Fuel Summary 2021-2022 Projected Residential Heating Season Expenditures<sup>1</sup>

	<i>Weather Normalized</i>		
	10% Below	Midpoint	10% Above
<b>Natural Gas</b>			
Consumption (Mcf)	73	81	89
Avg. Price (\$/Mcf)	\$8.40	\$8.40	\$8.40
Expenditures (\$)	\$673	\$740	\$807
<b>Heating Oil</b>			
Consumption (gallons)	370	418	460
Avg. Price (\$/gallon)	\$3.10	\$3.10	\$3.10
Expenditures (\$)	\$1,147	\$1,296	\$1,426
<b>Propane</b>			
Consumption (gallons)	572	635	698
Avg. Price (\$/gallon)	\$2.39	\$2.39	\$2.39
Expenditures (\$)	\$1,367	\$1,518	\$1,668

<sup>1</sup> Projections assume normal weather. Consumption, pricing, and expenditure data pertain to the winter heating season, which runs from November through March. Natural Gas prices are based on the October average rates for Michigan gas utilities, including distribution, customer charge and the cost of gas. Heating oil and propane prices are based on the residential price in Michigan for the first week of October. All prices are assumed to hold constant over the winter. Projected usage is based on EIA and MPSC data and calculations from MPSC staff.

Residential natural gas expenditures are expected to increase by \$193 compared to last winter's projection due to higher commodity prices for natural gas. Accordingly, the Summary assumes that current fuel prices will continue to hold steady throughout the winter, but acknowledges that these prices are often volatile, and can change rapidly as dynamic supply and demand conditions are impacted by severe weather, infrastructure failures, geopolitical instability, and other issues.

Prices for heating oil and propane have started the 2021/22 winter heating season above levels seen last year due to higher crude oil prices and lower stocks at the

national level. Winter expenditures for propane and heating oil are projected to increase by \$508 and \$519 respectively compared to what was projected a year ago using the first week of October average prices. However, should this season's winter temperatures deviate from historical norms, the National Oceanic and Atmospheric Administration (NOAA) anticipates that it may do so toward warmer temperatures. This could help reduce heating costs for Michigan households.

## Conclusion

As the winter heating season begins, residents should expect energy supplies to be readily available to meet their needs. 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.