Propane Market Fundamentals

For
Upper Peninsula Energy Task Force
November 13, 2019 | Escanaba, Michigan

By
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• EIA does not propose or advocate any policy positions
Overview

• Propane infrastructure continues to evolve as exports become the main driver of demand

• After a “golden-age,” rail movements of hydrocarbon gas liquids (HGL) are declining as new pipelines come online

• Producers continuously seek to maximize “net-back value” – the net return to the producer after accounting for processing and shipping

• Midwest demand is driven my residential/commercial and agricultural demand

• Imports from Canada play an outsized role in how the Midwest market is supplied
Propane-focused infrastructure is changing

- Mariner East 2 pipeline began operations Dec. 2018
- Sterling III expansion done in 2019Q1
- Western Canada’s new marine export terminal opened March 2019

Source: U.S. Energy Information Administration
Mt. Belvieu, TX and Conway, KS prices now on-par as strong winter heating and grain drying elevate demand above average levels for this time of year

Propane spot prices (Conway, KS and Mont Belvieu, TX)

Source: EIA, Bloomberg, data through November 11, 2019

Source: EIA, Bloomberg, data through November 11, 2019
Rail, now tracked by EIA, serves markets pipelines don’t reach, or when pipeline capacity is constrained

- EIA began publishing [HGL-by-rail data](#) in February 2017
- Identified over 1,000 rail stations handling propane, butanes, and/or propylene
- Nearly 700 of these stations serve the consumer propane market
- Data is available for movements within PADD, between PADDs, and to/from Canada
- Along with the data, EIA released a [Webinar](#) explaining the utility and impact of the HGL-by-rail data

Source: EIA, based on data shared with the Surface Transportation Board
Nearly all Midwest households using propane for space heating are in single-family homes in rural areas

Of homes that use propane for space heating:

• 83% are in rural areas

• 97% are single-family or mobile homes

Source: U.S. Census Bureau, 2011-2015 American Community Survey
Product supplied closely tracks with heating demand

**PADD 1**
- Propane product supplied: thousand barrels/month
- Heating degree days

**PADD 2**
- Propane product supplied: thousand barrels/month
- Heating degree days

Source: EIA *Propane Product Supplied; National Oceanic and Atmospheric Administration, Weighted Heating Degree Days*
NOAA’s projected temperatures: November 17 – Nov. 21, 2019, and November 19 – Nov 25, 2019

- NOAA forecasts high probability of above-normal temperatures west of the Mississippi, with lower temperatures early in the forecast giving way to above-average temperatures across the east later in the forecast.
- After multiple weeks of above-average heating fuel demand across the Midwest and East, the warming trend should result in lower-than-average heating fuel demand later in November, allowing propane retailers especially to begin refilling their depleted inventory.

A = temperatures above normal
N = equal chance that temperatures are above normal, normal, or below normal
B = temperatures below normal

Source: NOAA, Nov. 11, 2019
Delay in 2019 harvest, and associated grain drying demand, were forecasted early.

**Source:** USDA National Agricultural Statistics Service

*USDA 2013 data incomplete. Weeks 40 and 41 not available.
Elevated corn futures prices during the summer fill season provided economic impetus for end-use stock building of propane for drying.

corn futures price for delivery in December
$/bushel

Seasonal temperature forecast
Jul-Aug-Sep 2019

Sources: USDA National Agricultural Statistics Service; Bloomberg

Source: NOAA, June 20, 2019
2019 Midwest propane product supplied in the summer was above the 5-year range, suggesting strong inventory build at the end-use level.

Midwest (PADD 2) product supplied of propane
1,000 b/d

Source: U.S. Energy Information Administration, Midwest (PADD 2) Product Supplied of Propane
With pipelines on allocation, Conway-linked Midwest markets see premium expand. As source of incremental supply, Edmonton also rises.

propane spot prices
dollars per gallon

Source: EIA, Bloomberg, data through November 11, 2019
EIA’s weekly residential will-call propane price data for Midwest states shows a major anomaly in the 2013/14 winter

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Texas Gulf Coast spot

Source: U.S. Energy Information Administration, Heating Oil and Propane Update; EIA, Weekly Mont Belvieu, TX Propane Spot Price FOB
Most of the year, U.P. wholesale propane prices are sufficiently high to pull rail cargos from Edmonton; capacity may act as a constraint.

Propane spot prices:
- Dollars per gallon

Propane price spread:
- Dollars per gallon

Source: EIA, Bloomberg, data through November 11, 2019
Since opening of the Ridley Island Propane Export Terminal in British Columbia, discount for propane at Edmonton has dropped substantially.

Source: EIA, Bloomberg, data through November 11, 2019

propane spot prices
dollars per gallon

propane price spread
dollars per gallon

$0.0
$0.1
$0.2
$0.3
$0.4
$0.5
$0.6
$0.7
$0.8
$0.9
$1.0

-0.1
-0.2
-0.3
-0.4


Conway, KS
Edmonton, AB
Edmonton to Conway spread (RS)
approx. AB-KS rail (RS)

Source: EIA, Bloomberg, data through November 11, 2019
Lower demand in E. Canada resulted in less dedicated storage capacity; W. Canadian marine exports have caused a downward shift in stocks.

Source: Canada’s National Energy Board
As a major storage hub, Sarnia received growing volumes of railed-in propane for storage during summer season. This is changing

PADD 2 (Midwest) rail shipments of propane to Canada

PADD 1 (East Coast) propane exports overseas

Mariner East begins shipping propane
Mariner East 2 begins shipping propane

Source: U.S. Energy Information Administration Movements of Crude Oil and Selected Products by Rail; PAD District Exports by Destination
Canadian exports also redirecting flows away from PADD 2 to overseas markets, where premiums are significantly higher.

**Canadian exports of propane by destination**

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**Propane spot prices**

$/U.S. gallon

Source: Canada Energy Regulator, Export volume by destination - Query
PADD 2 (Midwest) propane inventories below the 5-year range

PADD 2 propane* inventories
million barrels

Source: EIA, Weekly Petroleum Status Report, data through November 1, 2019

*propane/propylene for fuel use only

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PADD 2 (Midwest) propane inventories below 5-year-average levels

PADD 2 propane* inventories, difference from 5-year average
million barrels

Source: EIA, Weekly Petroleum Status Report, data through November 1, 2019

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*propane/propylene for fuel use only
Selected state propane* inventories

Kansas propane/propylene stock at refineries, terminals, and natural gas plants (not pipelines)

Illinois, Indiana, Ohio propane/propylene stock at refineries, terminals, and natural gas plants (not pipelines)

Michigan propane/propylene stock at refineries, terminals, and natural gas plants (not pipelines)

Iowa, Minnesota, Wisconsin propane/propylene stock at refineries, terminals, and natural gas plants (not pipelines)


*propane/propylene for fuel use only
PADD 3 (Gulf Coast) propane inventories near the top of the 5-year range

PADD 3 propane* inventories
million barrels

Source: EIA, Weekly Petroleum Status Report, data through November 1, 2019

*propane/propylene for fuel use only
PADD 3 (Gulf Coast) propane inventories above 5-year average levels

PADD 3 propane* inventories, difference from 5-year average
million barrels

Source: EIA, Weekly Petroleum Status Report, data through November 1, 2019

*propane/propylene for fuel use only
State Heating Oil and Propane Program (SHOPP) updates

• SHOPP is a collaborative program between states and EIA that provides weekly wholesale and retail prices for heating oil and propane at the state level.

• EIA expanded SHOPP in October 2014 to include 14 additional states in propane price data collection. In 2016, EIA added 10 new states to its wholesale propane price publication. This should be taken into consideration when comparing the average prices for the U.S., PADD 1, PADD 1B, PADD 1C, and PADD 2 averages.

• EIA has been providing more granular inventory data to states on a weekly basis since the 2016/2017 heating season.

• EIA implemented two new samples for residential heating oil and propane in October 2019. Under the new sampling methodology EIA is publishing standard errors for SHOPP prices.
Maps of states participating in Winter Fuels Survey

Petroleum Administration for Defense Districts
Winter Heating Fuels Survey — PADD 1 and 2 represented States

Petroleum Administration for Defense Districts
Winter Heating Fuels Survey — PADD 1, 2, 3, and 4 represented States

Source: EIA, Heating Oil and Propane Update
Retail propane prices this heating season below prices reported for the same week last year in PADDs 1 and 2

Source: State Heating Oil and Propane Program, data through November 4, 2019
Various days-of supply/disposition measures

U.S. weekly stocks of propane/propylene

days of supply & disposition

Note: *disposition = domestic product supplied + exports
For more information, please see EIA’s webinar on Propane Market Indicators and Measures of Supply Adequacy
Source: U.S. Energy Information Administration, Weekly Petroleum Status Report, data through November 1, 2019
For more information


State Energy Data Portal | www.eia.gov/state

Winter Heating Fuels Site | www.eia.gov/special/heatingfuels/

Movements of Propane by Rail | http://www.eia.gov/dnav/pet/pet_move_railNA_a_EPLLPA_RAIL_mbbl_m.htm

Today in Energy | www.eia.gov/todayinenergy

Short-Term Energy Outlook | www.eia.gov/steo


Annual Energy Outlook | www.eia.gov/aeo

International Energy Outlook | www.eia.gov/ieo

Monthly Energy Review | www.eia.gov/mer