



NYSERDA

Petroleum Fuels Winter Outlook

**2016 – 17 New York State Winter
Fuels Outlook Meeting**

October 27, 2016

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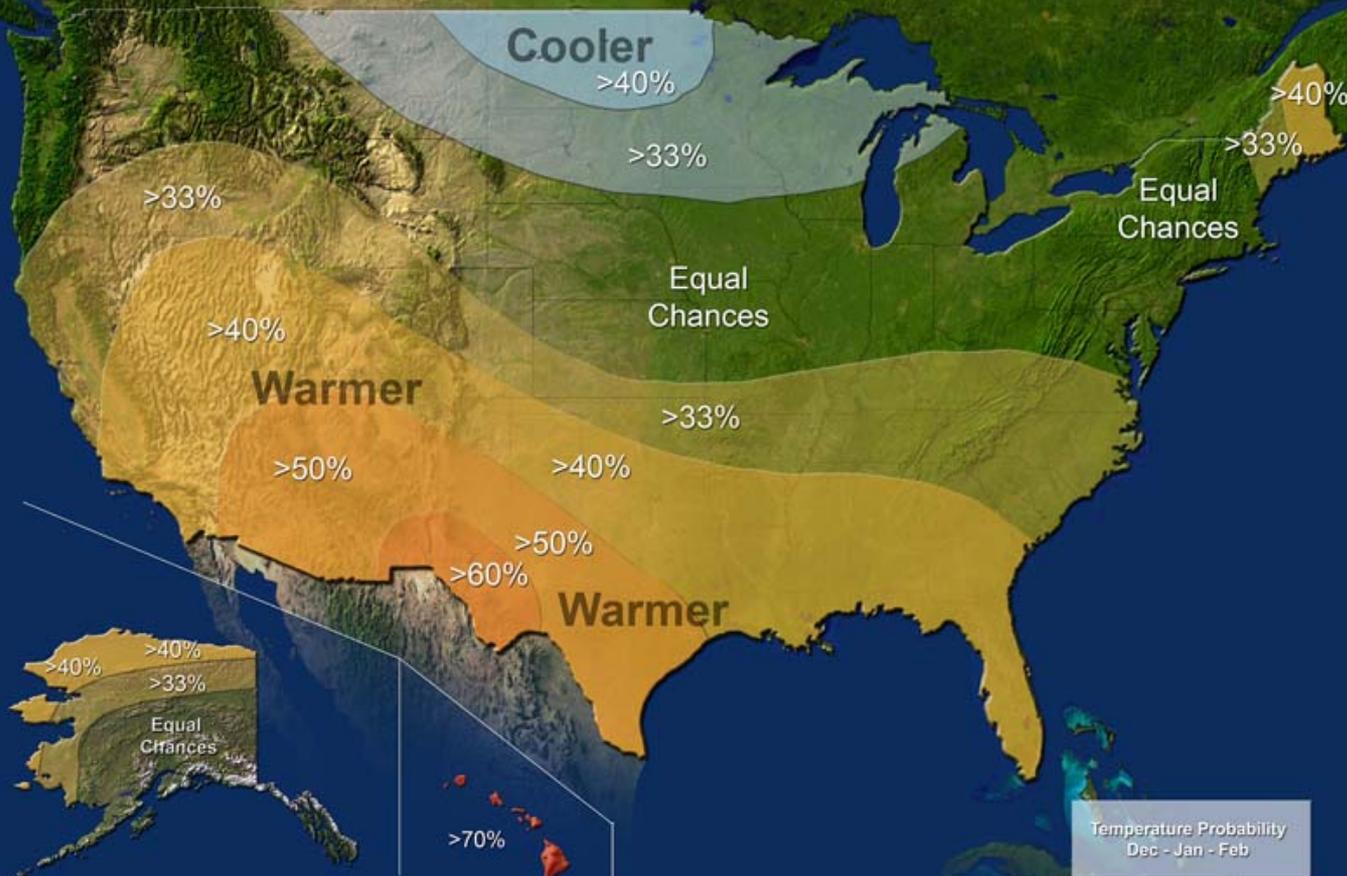
Contents

- NOAA Weather Forecast
- U.S. EIA Winter Fuels Outlook for 2016-17 Winter Season
- Crude Oil
- Home Heating Oil and Distillate Fuels
- Propane

NOAA Weather Forecast

U.S. Winter Outlook

Temperature

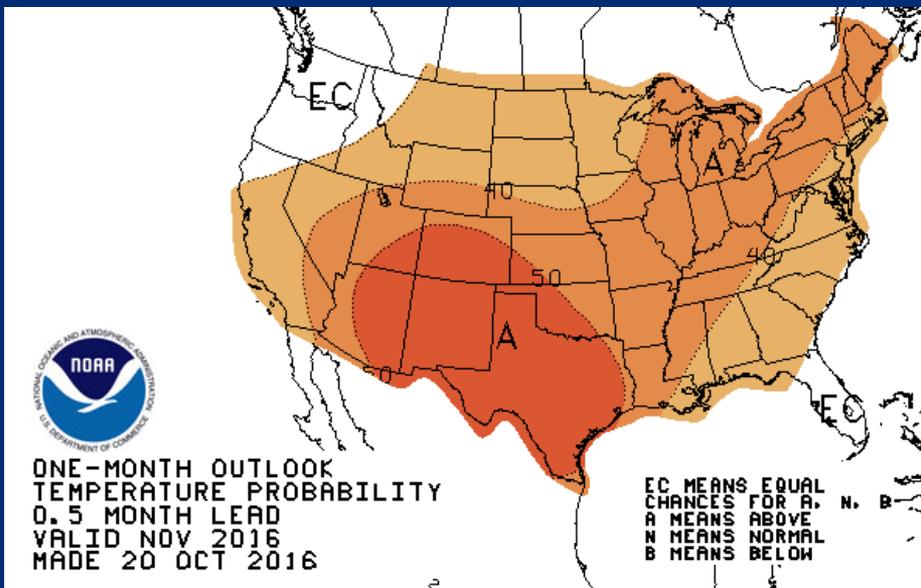


- Equal chances of (33%) of above normal, near normal, and below normal temperatures for New York State
- NOAA U.S. Winter Outlook Temperature Probability for Dec. – Jan. –Feb. released Oct. 20

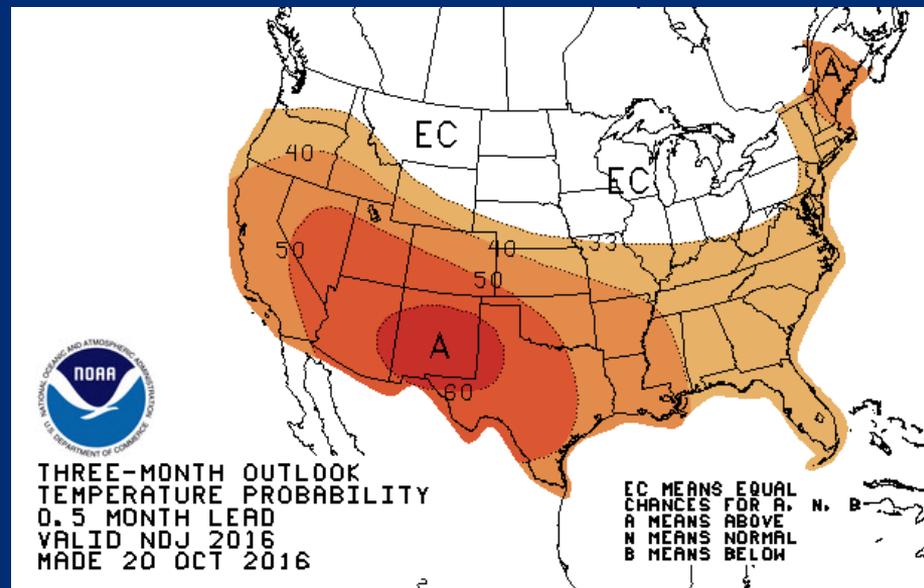
Temperature Probability
Dec - Jan - Feb

NOAA Winter Weather Outlook 2016-2017

November 2016



November-January 2016-17



NOAA Winter Weather Outlook 2016-2017

New York HDD Forecast (9/15/16)

Month	Forecast HDD	Normal (1981-2010)	Forecast Departure	%	Last Year (2015-2016)	Forecast Departure	%
Oct	376	392	-16	-4%	429	-53	-12%
Nov	656	665	-9	-1%	560	96	17%
Dec	1006	1016	-10	-1%	662	344	52%
Jan	1182	1183	-1	0%	1124	58	5%
Feb	998	999	-1	0%	970	28	3%
Mar	870	870	0	0%	711	159	22%
Apr	499	500	-1	0%	579	-80	-14%
Total	5587	5625	-38	-1%	5035	552	11%

NOAA Outlook New York heating degree-days forecast:

- 1% warmer than normal (1981-2010) winter
- 11% colder than last season.

NOAA Winter Weather Outlook 2016-2017

NOAA NYS Winter HDD Forecast



Source: NOAA

NOAA Outlook
New York heating
degree-days
forecast:

- 1% warmer than normal (1981-2010) winter
- 11% colder than last season.



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New York State Heating Degree-Days

NY Statewide Heating Degree Days
Current, Previous and Normal Year



Source: NOAA National Climate Data Center

- For the week ending **October 22**, NYS cumulative HDD's since **October 1** total **136 HDD** and are **152 HDD** or **52.8%** below the normal level and **172 HDD's** or **55.8%** below last year's level.
- The **136 HDD's** represent about **2.4%** of the total normal heating season.

U.S. EIA Winter Fuels Outlook for 2016-17 Winter Season

U.S. EIA Winter Fuels Outlook for 2016-17

- EIA expects higher heating fuel prices this winter for homes that heat with natural gas, heating oil, and propane compared to last year. Electricity prices are expected to be marginally higher.
- Colder than last winter temperatures are expected with the Northeast projected to have 17% more heating degree-days.
- With colder temperatures and higher prices, EIA projects higher average household heating fuel expenditures



Prices



HDD



Expenditures

EIA forecasts scenarios if temperatures are 10% warmer and 10% colder than the base case

Percent change in fuel bills from last winter (forecast)

Fuel bill	Base case forecast	If 10% warmer than forecast	If 10% colder than forecast
Heating oil	38	23	56
Natural gas	22	12	31
Propane *	26	6	49
Electricity	5	2	9

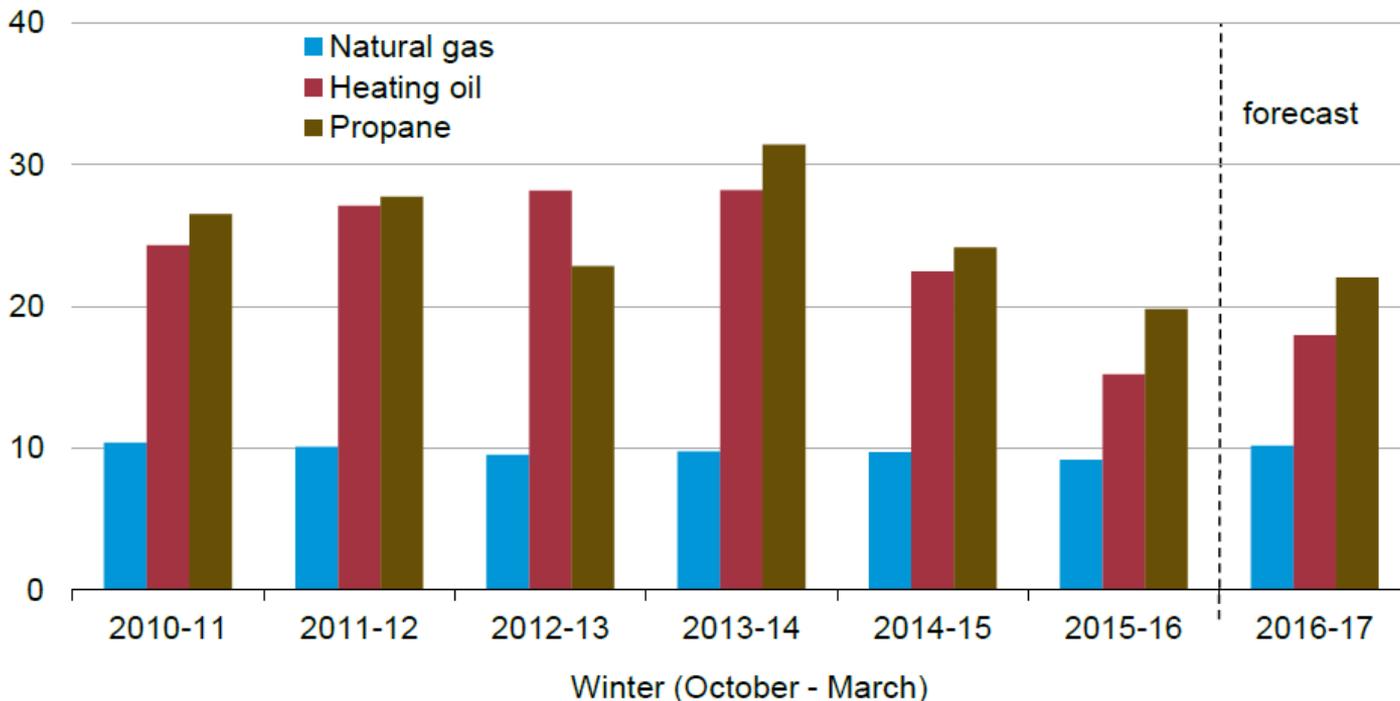
Note: * Propane expenditures are a volume-weighted average of the Northeast and Midwest regions. All others are U.S. volume-weighted averages. Propane prices do not reflect prices locked in before the winter heating season starts

Source: EIA Short-Term Energy Outlook, October 2016.

- Expenditures are predicted to be higher this winter
- The amount higher is highly dependent on the weather

Prices for all fuels are forecast to be higher than last winter, but heating oil and propane prices are expected to remain below levels from 2010-14 when crude oil prices were higher

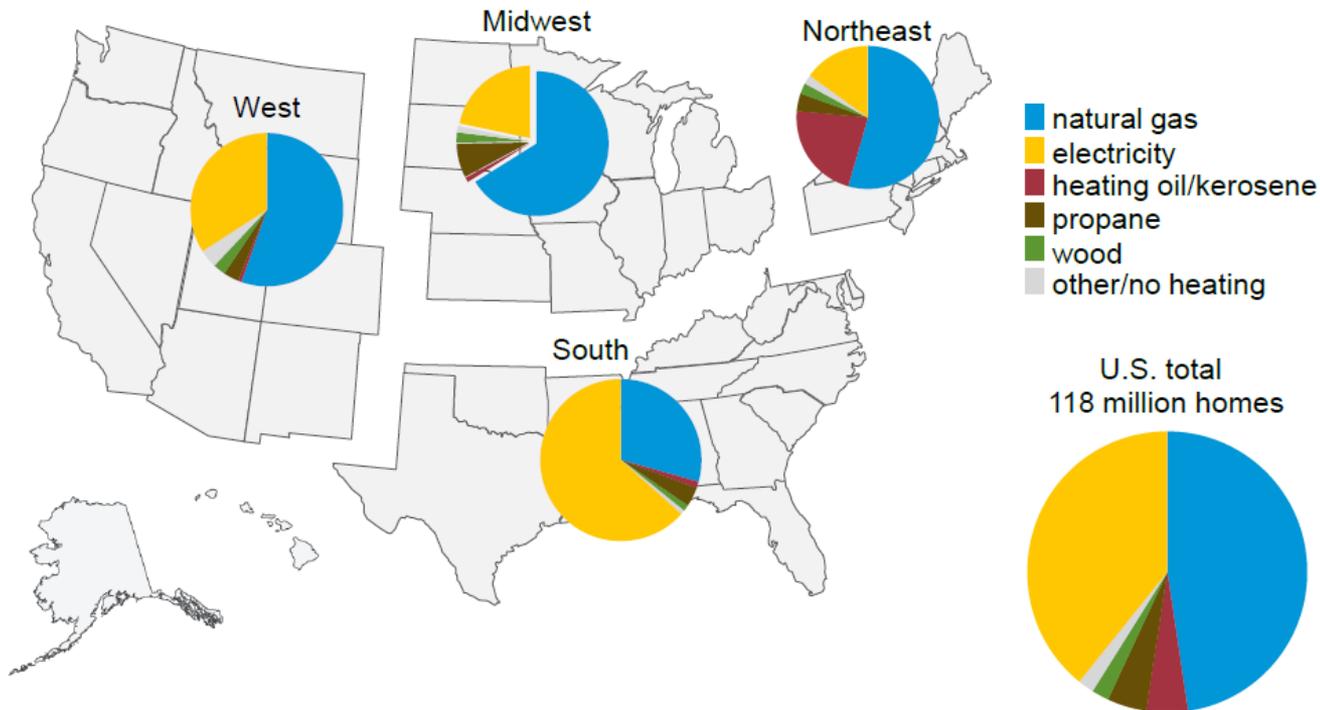
U.S. average residential winter heating fuel prices
dollars per million Btu



Source: EIA Short-Term Energy Outlook, October 2016.

Heating fuel market shares vary across U.S. regions

Share of homes by primary space-heating fuel and Census Region



2015 New York Percentages:

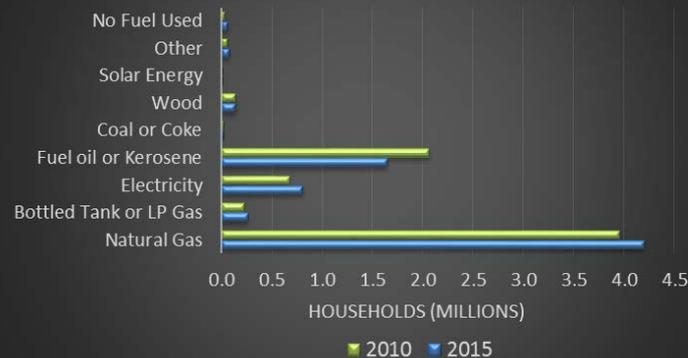
- 58.1% Natural Gas
- 22.8% Heating Oil
- 3.7% Propane
- 11.2% Electricity
- 1.9% Wood
- 2.3% Other

New York State Household Heating Fuel

New York State Household Heating Fuel	2015	%	2010	%	Change	% Change
Total Occupied Housing Units	7,233,694	100%	7,196,427	100%	37,267	1%
Natural Gas	4,202,413	58%	3,961,085	55%	241,328	6%
Bottled Tank or LP Gas	265,224	4%	227,607	3%	37,617	17%
Electricity	808,370	11%	676,262	9%	132,108	20%
Fuel oil or Kerosene	1,649,860	23%	2,068,004	29%	(418,144)	-20%
Coal or Coke	18,107	0%	19,949	0%	(1,842)	-9%
Wood	141,016	2%	143,242	2%	(2,226)	-2%
Solar Energy	3,120	0%	1,823	0%	1,297	71%
Other	78,999	1%	61,664	1%	17,335	28%
No Fuel Used	66,585	1%	36,791	1%	29,794	81%

- Natural Gas up 241k homes (+6%) over 5 years
- Heating Oil down 418k homes (-20%) over 5 years

New York State Household Heating Fuel



New York State Winter Fuels Outlook, October 2016

New York Winter Heating Oil and Propane Fuel Summary

Household	Actual		Forecast	
	<u>Avg. 10-15</u>	<u>15-16</u>	<u>16-17</u>	<u>% Change</u>
Heating Oil				
Consumption (gals)	788	671	771	14.9
Avg. Price (\$/gal)	3.88	2.52	3.03	20.1
Expenditures (\$)	3,062	1,690	2,332	38.0
Propane				
Consumption (gals)	1,186	1,009	1,141	13.1
Avg. Price (\$/gal)	3.10	2.42	2.59	7.0
Expenditures (\$)	3,676	2,442	2,955	21.0

Note: Individual household volumes, and so, expenditures will vary.

Note: Heating Oil data reflect New York prices and adjusted consumption to New York Averages.

Note: Propane data reflect New York prices and adjusted consumption to Btu equivalent heating oil.

Source: EIA Short-Term Energy Outlook, October 2016, NYSERDA

New York State Winter Fuels Outlook, October 2016

New York Winter Natural Gas & Electric Fuel Summary

Household	Actual		Forecast	
	<u>Avg. 10-15</u>	<u>15-16</u>	<u>16-17</u>	<u>% Change</u>
Natural Gas				
Consumption (mcf)	80.4	69.9	79.4	13.6
Avg. Price (\$/mcf)	12.39	11.21	12.70	13.3
Expenditures (\$)	996	783	1,008	28.7
Electricity				
Consumption (kwh)	6,969	6,494	6,907	6.4
Avg. Price (\$/kwh)	0.185	0.174	0.176	1.1
Expenditures (\$)	1,287	1,129	1,214	7.5

Note: Individual household volumes, and so, expenditures will vary.

Note: Natural Gas consumption is adjusted to New York Averages while Electricity consumption is based on Northeast Averages.

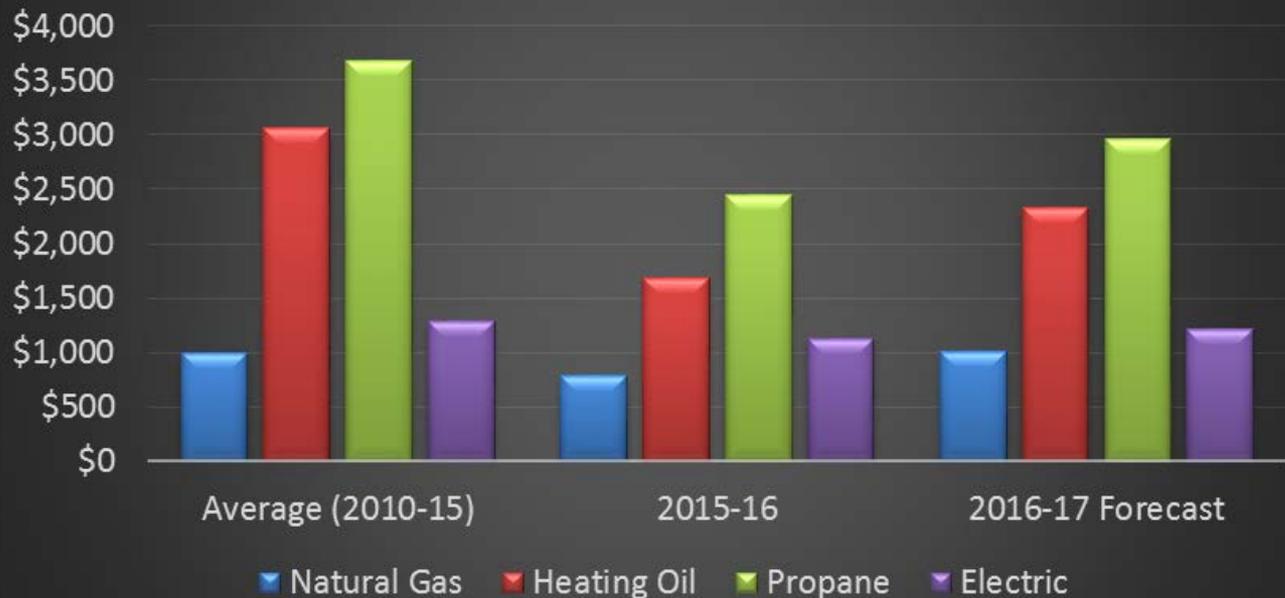
Note: Prices reflect New York average prices.

Source: EIA Short-Term Energy Outlook, October 2016, NYSERDA



Estimated Average Heating Expenditures

NY Estimated Average Heating Bills by Fuel



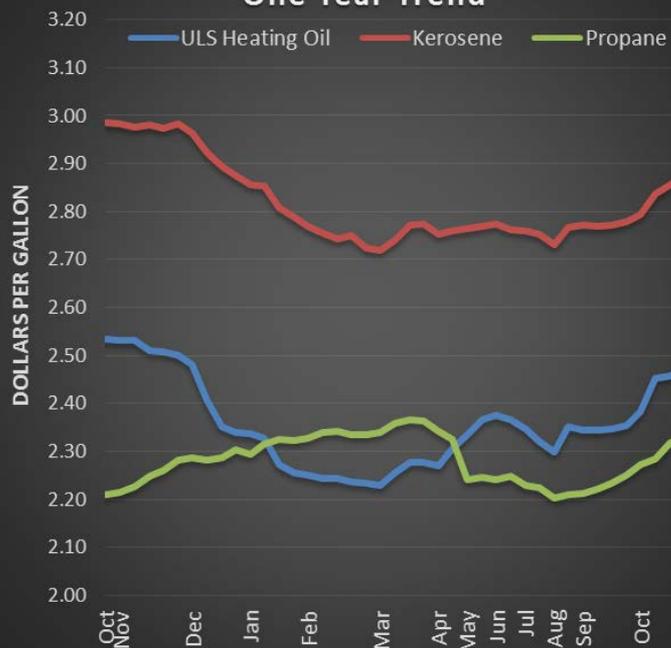
Source: EIA, NYSERDA

Fuel Type	% Change Last Year	% Change 5-Year Avg.
Natural Gas	28.7%	1.2%
Heating Oil	38.0%	-23.9%
Propane	21.0%	-19.6%
Electric	7.5%	-5.7%

New York State Retail Heating Fuel Surveys

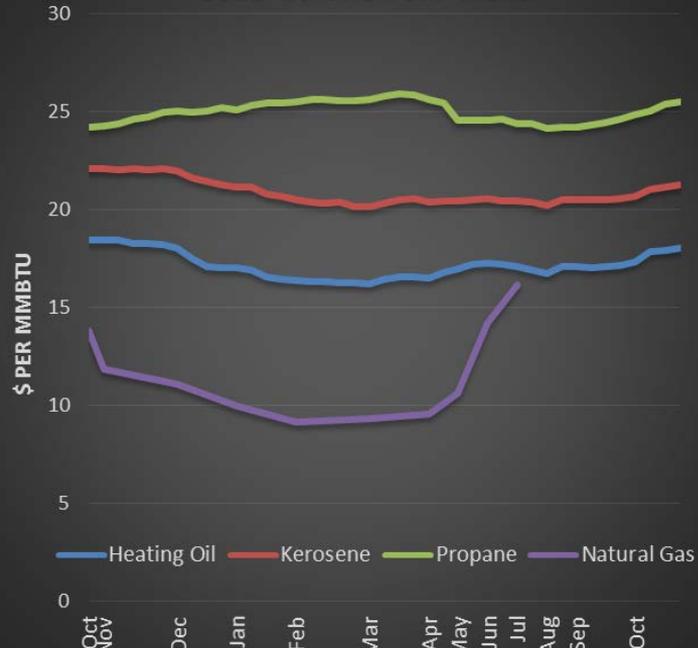
Current Prices: Heating Oil - \$2.47, Kerosene - \$2.87, Propane - \$2.33

**NYS Heating Fuel Prices, 2015-16
One Year Trend**



source: NYSDERDA

**NYS Heating Fuel Prices, \$ per MMBTU,
2015-16 One Year Trend**



source: NYSDERDA, USEIA

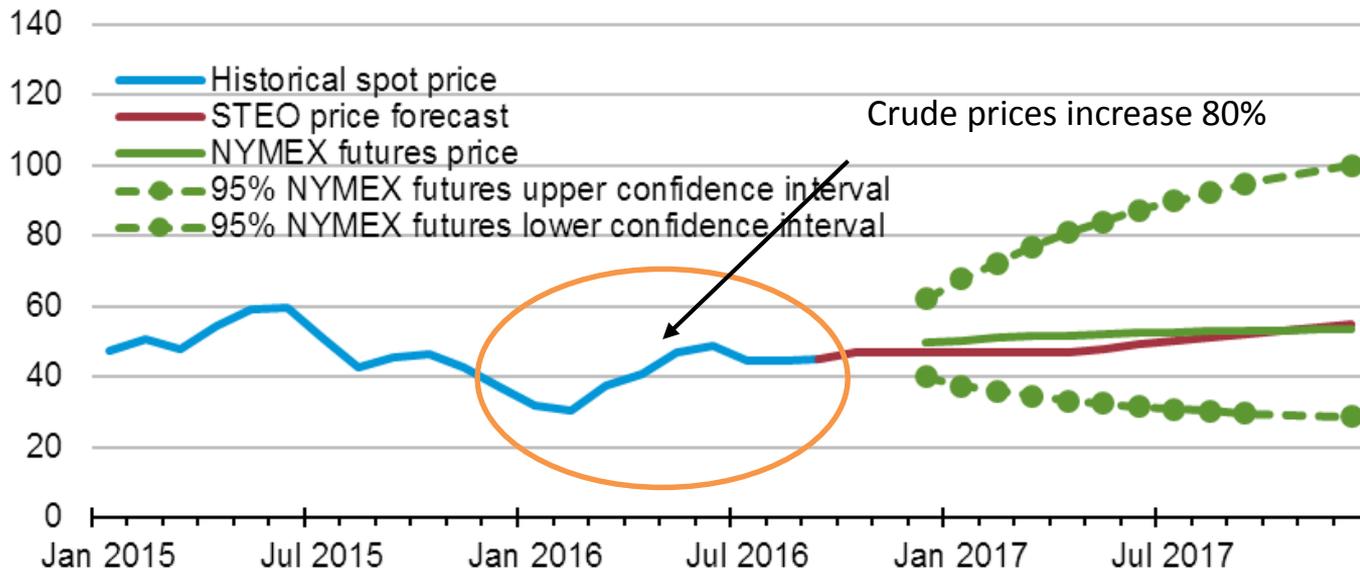
- Year over year change:
- Heating Oil: -2.3%
- Kerosene: -3.8%
- Propane: +5.4%

Crude Oil

U.S. Crude Oil Prices

West Texas intermediate (WTI) crude oil price

dollars per barrel

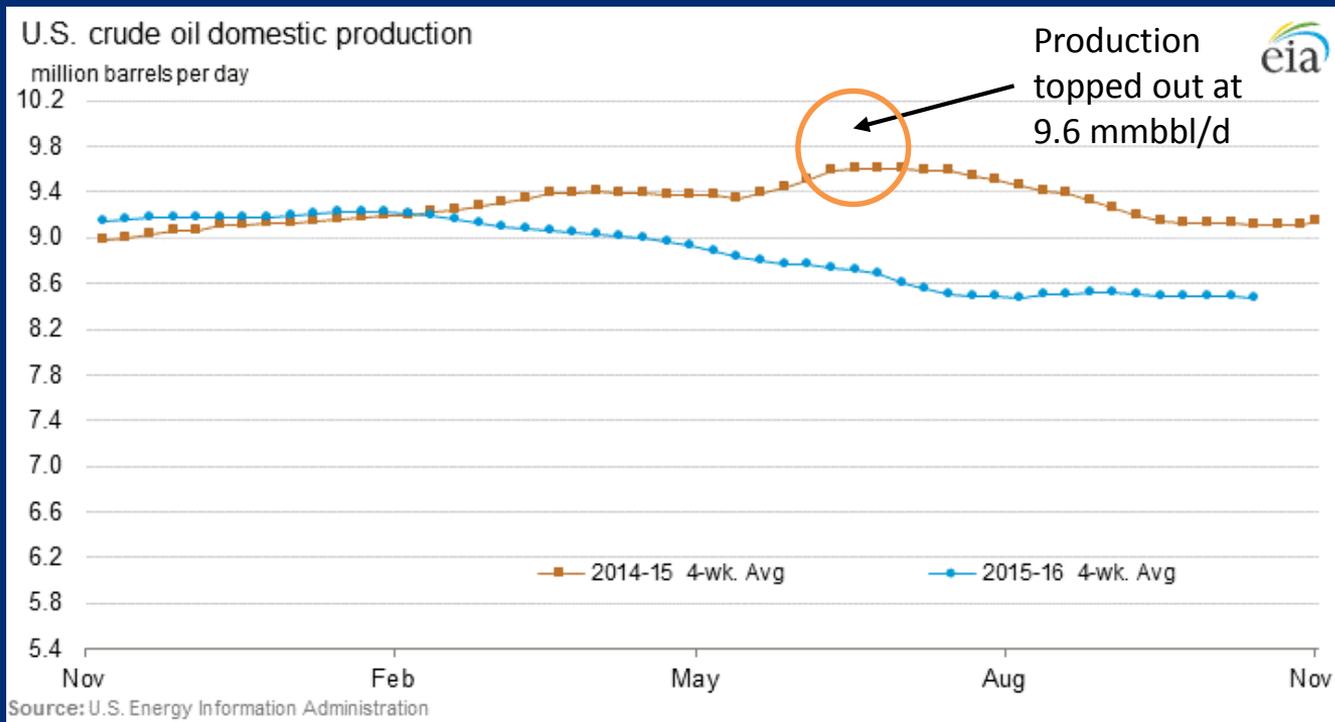


Note: Confidence interval derived from options market information for the 5 trading days ending Oct 6, 2016. Intervals not calculated for months with sparse trading in near-the-money options contracts.

Source: Short-Term Energy Outlook, October 2016.

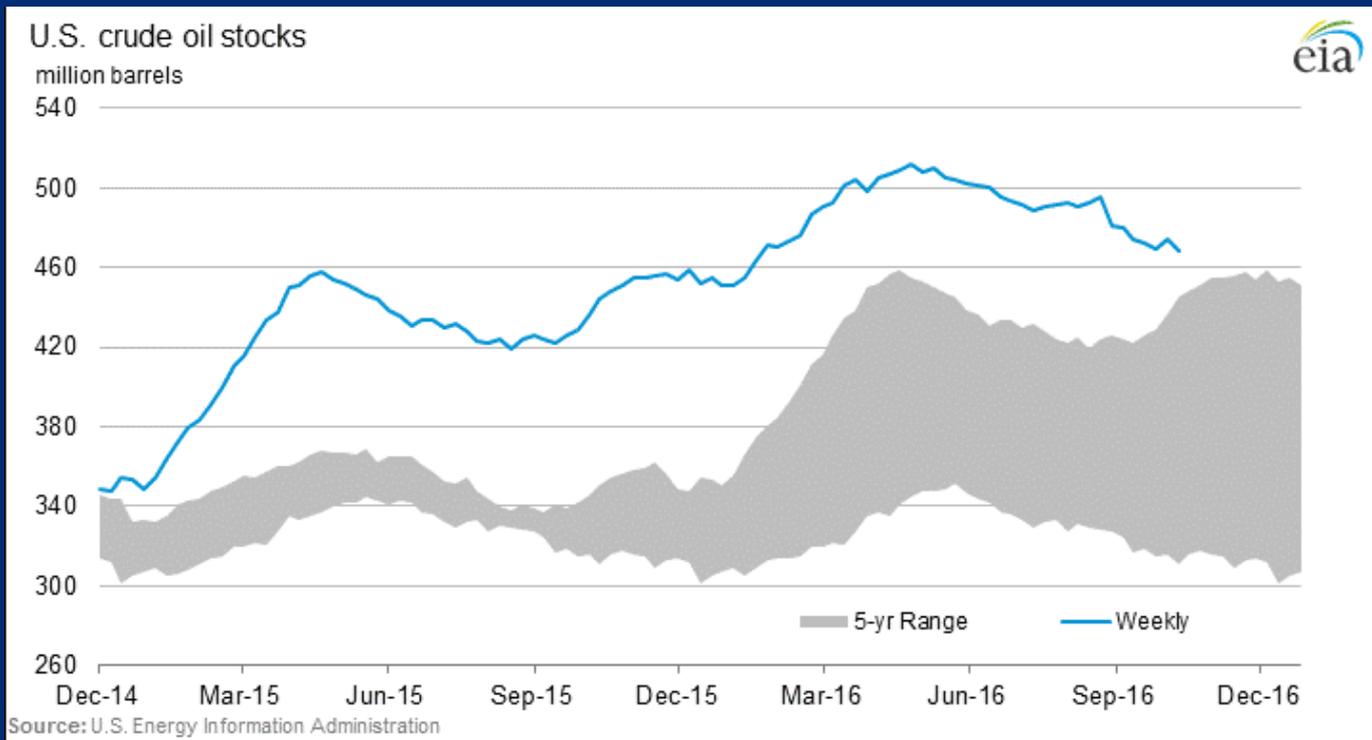
- WTI crude oil prices increased \$22.42/bbl or 80% from February 2016 to October 2016
- Current weekly average WTI crude oil price for week of Oct. 21 is \$50.56/bbl

U.S. Crude Oil Production



- Production topped out at 9.6 million barrels per day in June 2015
- Current production is 8.5 million barrels per day
- Rig count decreased 40% over previous year but up 24% over past three months.

U.S. Crude Oil Stocks



- Current level 468 million barrels
- 20 million barrels above last year
- Peak 512 million barrels in April
- Decreased 44 million barrels since April

Heating Oil

Northeast Heating Oil Demand

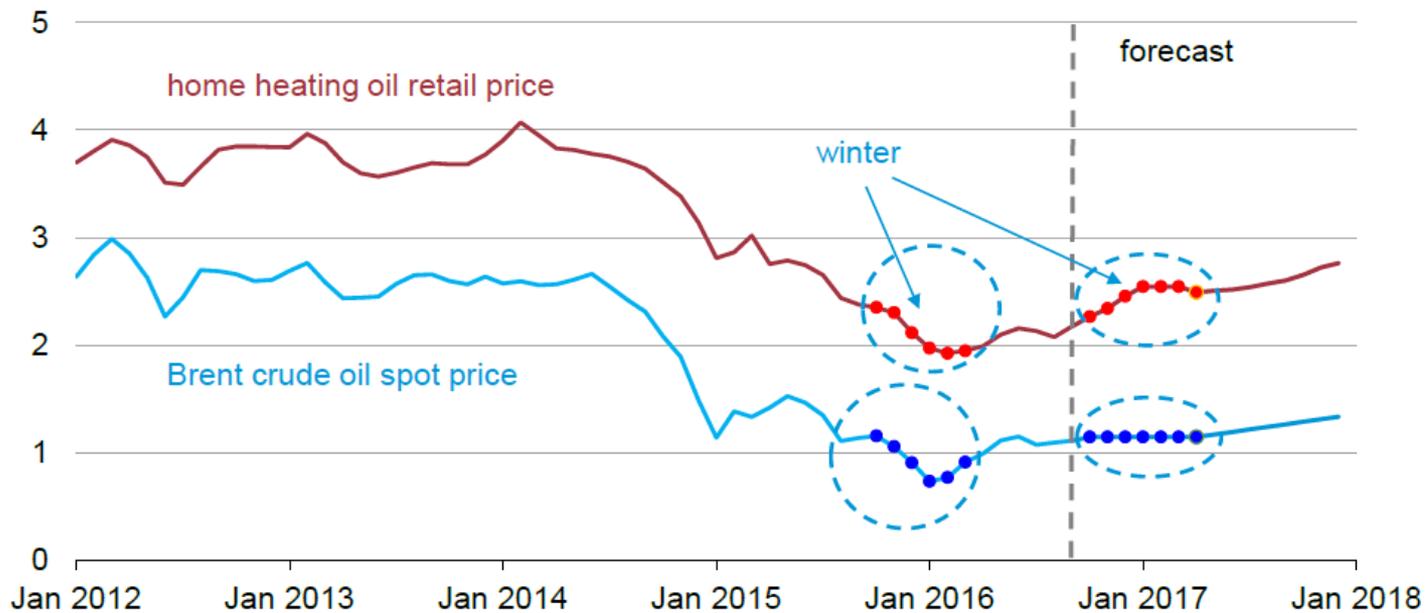
- U.S. home heating oil consumption is highly concentrated in the Northeast.
- Four-fifths of all homes in the United States that use heating oil are located in the Northeast (source: U.S. Census Bureau, 2015 American Community Survey).
- 23% of homes in the Northeast, or 4.8 million homes, use oil as their main heating fuel.

Winter 2016-17 takeaways – Heating oil

- Brent crude oil spot prices are expected to average \$48 per barrel (bbl) this winter, \$9/bbl (22 cents/gal) higher than last winter, but they are not expected to return to levels seen from 2010-14 when the average price of Brent crude oil exceeded \$100/bbl.
- Distillate stocks in the Mid-Atlantic totaled 39.3 million barrels on October 21, 2.8 million barrels (8%) above the same time last year and close to the highest level for any week since 2010.
- Ample supplies should be able to meet demand unless severely cold temperatures in the Northeast coincide with severely cold temperatures in Europe combined with any localized supply issues or disruptions.

Higher forecast residential heating oil prices this winter reflect higher crude oil prices

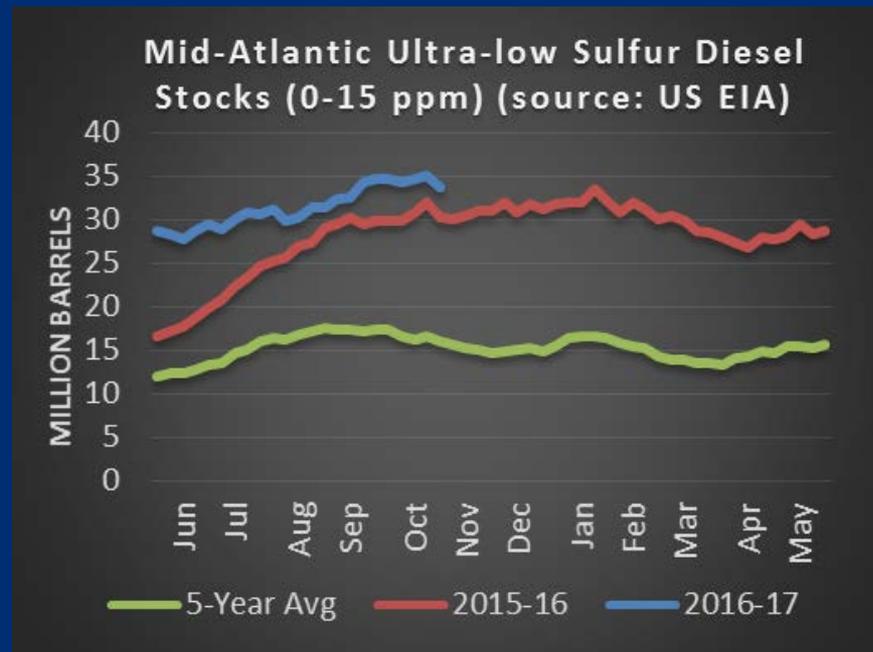
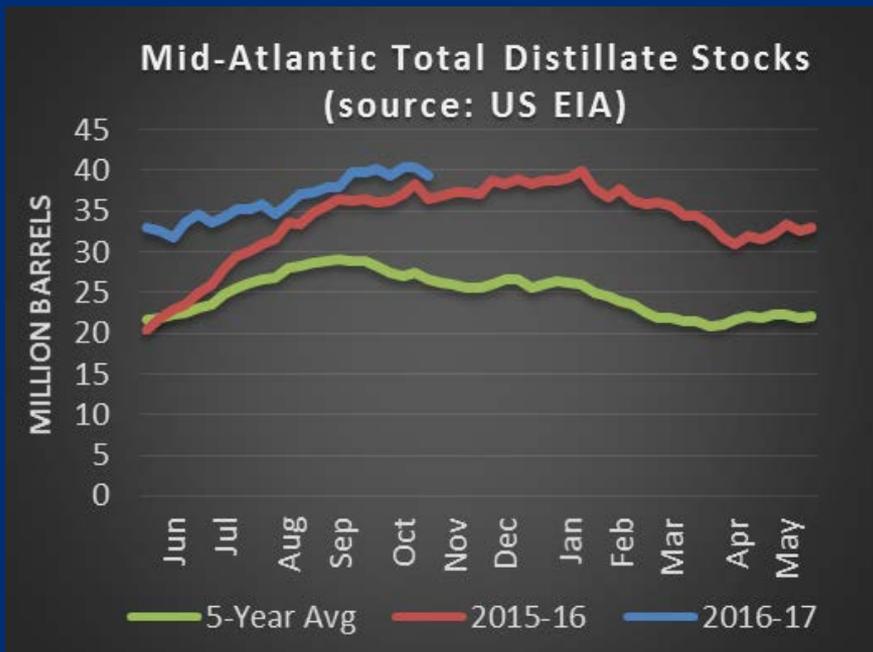
monthly average heating oil and Brent crude oil prices
dollars per gallon



Note: Home heating oil retail price includes taxes.

Source: EIA Short-Term Energy Outlook, October 2016.

Mid-Atlantic Distillate Stocks



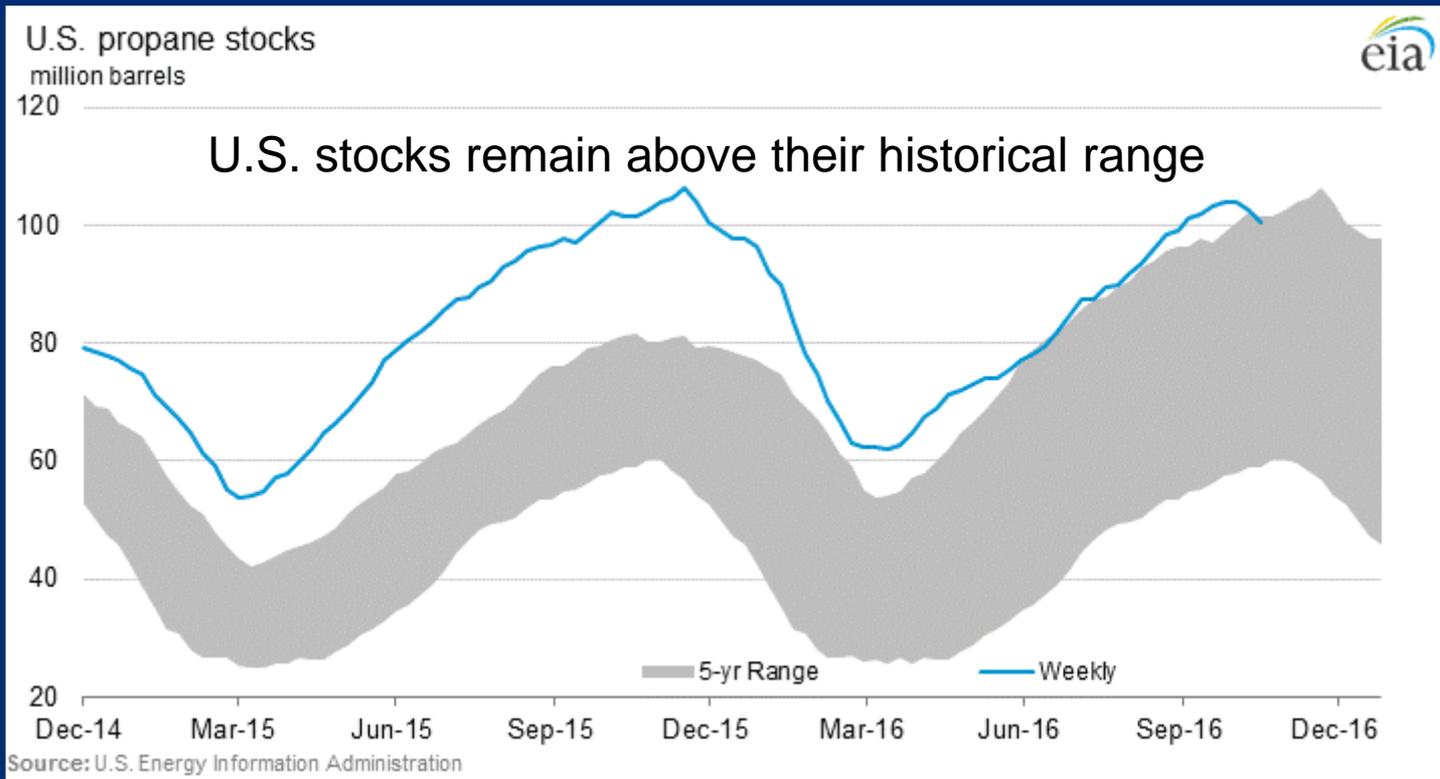
- For the week ending October 21, total Mid-Atlantic distillate stocks are 47.2% above the 5-year average and 7.7% above last year's levels.
- Ultra-low sulfur distillate stocks are 112.6% above the 5-year average and 11.7% higher than last year's levels.

Propane

Winter 2016-17 takeaways – Propane

- U.S. propane inventories on October 21 were 1 million barrels (1%) lower than year-ago levels, and 24 million barrels (32%) above the five-year average; while Mid-Atlantic propane inventories were 2% lower than the year-ago level and 11% above five-year average.
- U.S. propane exports reached record levels in 2016, increasing by 230,000 b/d (41%) during the first half of 2016 compared with the first half of 2015.
- U.S. propane production at natural gas liquids plants and refineries is expected to be 1% higher than last winter.
- Higher inventory levels and improved rail delivery networks for propane should contribute to more robust propane supply chains than previous years.

U.S. Propane Stocks



Regional Propane Stocks

Mid-Atlantic Propane Stocks
(source: US EIA)



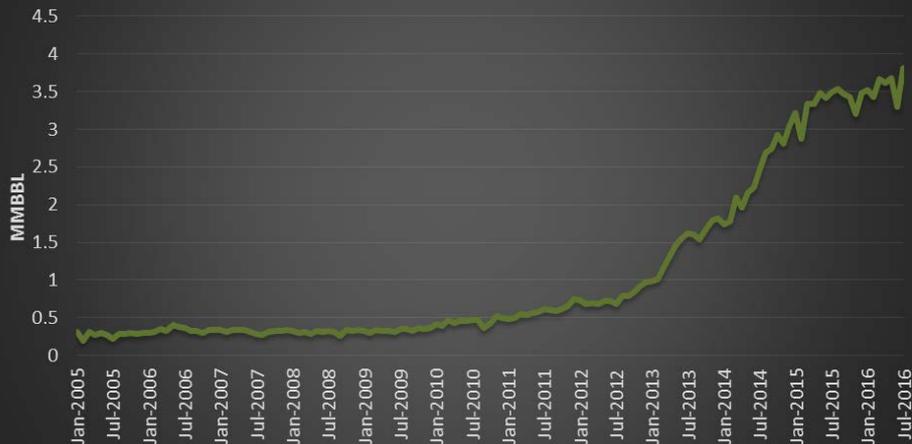
New England Propane Stocks
(source: US EIA)



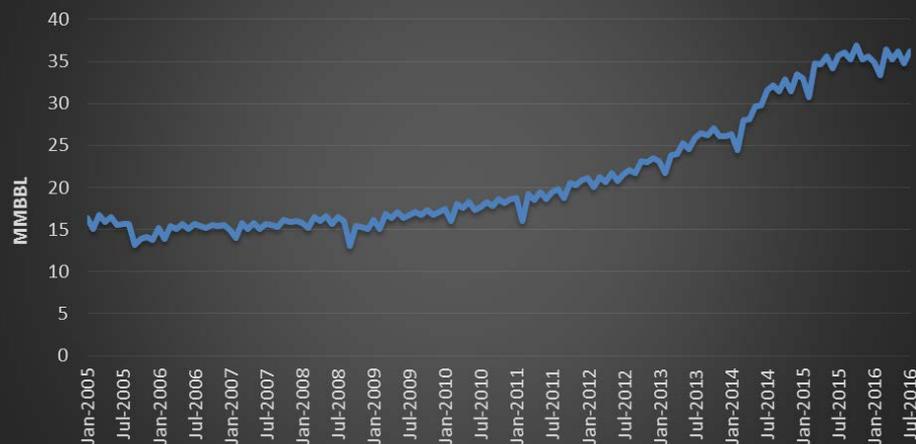
- Mid-Atlantic propane stocks are above average and similar to last year's level heading into the winter season.
- Sea-3 terminal in NH remains operational and is the only remaining open marine propane terminal in New England. A shipment of propane was received in July.

Propane Production

PADD 1 Production of Propane and Propylene



U.S. Production of Propane and Propylene



- Since 2008, East Coast propane production has increased by 1088% while the U.S. propane production has increased by 129%.
- Increased propane production primarily due to increased natural gas production.



Questions and Discussion

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