

# *CLEAN CITIES* Alternative Fuel Price Report



## Welcome to the

### July 2016 issue!

The Clean Cities Alternative Fuel Price Report is a quarterly report designed to keep Clean Cities coalitions and other interested parties up to date on the prices of alternative and conventional fuels in the United States. This issue summarizes prices that were submitted between July 1, 2016 and July 15, 2016 by Clean Cities coordinators, fuel providers, and other Clean Cities stakeholders.

## What's New in This Issue, Liquefied Natural Gas (LNG):

In a reversal of a trend that we have seen for the past three quarters, the national average price for most fuels, on a per gallon basis, as reported by Clean Cities coordinators, has increased relative to the previous quarter, as shown in Table 2 and Tables 11a through 11g. The lone exception was propane, with a national average price that decreased by \$0.01 per gallon. There was some variation within PADD regions, with CNG, LNG and B99/B100 also showing small decreases in several regions, relative to the April report.

### Liquefied Natural Gas (LNG)

There were a total of 42 liquefied natural gas (LNG) prices reported by Clean Cities coordinators during the July data collection period. Beginning with this issue, we will include a separate section on LNG, shown on pages 10-11.

In July 2016, at its annual meeting, the National Conference on Weights and Measures (NCWM) voted to approve the diesel gallon equivalent (DGE) standard as an authorized method of measuring natural gas sold as a vehicular fuel. All the LNG prices that were submitted to us by Clean Cities coordinators for the July AFPR were in \$/DGE.

While LNG data has not previously been shown in a separate section in the report, we do have a record of historical prices submitted by Clean Cities coordinators, dating from January 2009, when 5 data points were submitted. We have, therefore, included a historical graph of LNG vs Diesel prices (Figure 7), as well as Table 12d, comparing LNG prices submitted in July 2016 and April 2016.

### Renewable Diesel

Clean Cities Coordinators in California and Oregon reported a total of six (6) data points for renewable diesel during the July data collection period, with an average price of \$2.43/gallon. The number of data points submitted by Coordinators is currently very small. If usage should begin to pick up, however, we may consider including a separate section in the AFPR on renewable diesel in the future.

### Special Price Variability Report

We recently prepared a special report on historical price variability, as a supplement to the quarterly Clean Cities Alternative Fuel Price Report. This report examines how variable the alternative and conventional fuel prices, submitted by Clean Cities Coordinators, have been over time, from September 2005 through April 2016. This report will be posted on the Alternative Fuels Data Center website, <http://www.afdc.energy.gov/fuels/prices.html>, along with the July Alternative Fuel Price Report.

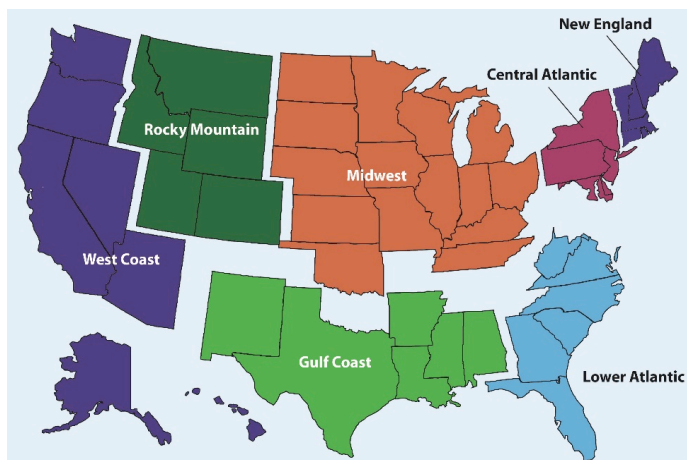
## Looking Ahead

We will continue to improve the Alternative Fuel Price Report, based on user feedback. We look forward to hearing from you as we implement these upgrades.

## Methodology

- This report’s prices represent retail, at-the-pump sales prices for each fuel, including federal and state motor fuel taxes.<sup>1</sup>
- Clean Cities coordinators, fuel providers, and other key stakeholders provide prices for fuels in their areas on a voluntary basis.
- Prices were submitted for all major alternative fuels currently in widespread use, i.e. natural gas, propane, biodiesel, and ethanol.
- Prices were submitted for conventional fuels from stations that also sell alternative fuels, or from nearby stations.
- Prices from public and private refueling stations are included.<sup>2</sup>
- Prices were averaged to determine regional price trends by fuel and variability in fuel price within and among regions.<sup>3</sup>
- Some states charge a flat annual fee, in lieu of collecting motor fuel taxes at the pump, usually for large trucks using gaseous fuels like compressed natural gas (CNG) and liquefied petroleum gas (LPG or propane). These flat fees are not included in the prices reported in these pages.

- Consistent with the U.S. Energy Information Administration (EIA) fuel price reporting format, prices are grouped by the Petroleum Administration for Defense Districts (PADD). The PADD districts are illustrated in the map below.



**FIGURE 1**  
**PETROLEUM ADMINISTRATION FOR DEFENSE DISTRICTS (PADD)**

Source: U.S. Energy Information Administration

TABLE 1 Number of Data Points Submitted								
Region	Gasoline	Diesel	CNG	LNG	Ethanol	Propane	B20	B99/B100
New England	39	31	28	1	7	26	10	4
Central Atlantic	84	76	94	0	95	51	29	3
Lower Atlantic	72	59	59	1	78	121	17	17
Midwest	264	152	126	5	241	79	25	0
Gulf Coast	95	74	63	8	133	138	13	2
Rocky Mountain	98	85	107	10	53	75	11	0
West Coast	126	137	123	17	66	124	25	19
<b>TOTAL</b>	<b>778</b>	<b>614</b>	<b>600</b>	<b>42</b>	<b>673</b>	<b>614</b>	<b>130</b>	<b>45</b>

<sup>1</sup> In some cases, prices were submitted by government refueling facilities, and motor fuel taxes were not included in the prices reported to Clean Cities. In these instances, the appropriate federal and state motor fuel taxes have been added to the reported prices to provide a more representative basis for comparison.

<sup>2</sup> Public refueling stations are open to the public, while private fueling stations are privately-owned or available only to selected fleets.

<sup>3</sup> Fuel price averages for this report are determined by simply averaging the individual data points received. A comparison of average fuel prices for private and for public stations by region can be found on pages 22-23.

## Summary of Current Report Information



Table 2 shows national average retail fuel prices for this report and the previous report. Changes in average retail prices from one quarter to another may be due to a number of factors, including an actual change in price, different sample sizes, the inclusion of different locations, and seasonal variations in demand.

Prices in this report were reported in the units in which they are typically sold, for example, dollars per gallon of gasoline or dollars per gasoline gallon equivalent (GGE) of CNG.

Consumer interest in alternative fuels generally increases when the alternative fuel price is less than the conventional fuel price on a per gallon basis, even if that differential does not directly translate to savings on an energy-equivalent basis.

Fuel Type <sup>4</sup>	April 2016	July 2016	Change in Price April-July	Units of Measurement
Gasoline (E10)	\$2.06	\$2.26	\$0.20	per gallon
Diesel	\$2.13	\$2.46	\$0.33	per gallon
CNG	\$2.02	\$2.05	\$0.03	per GGE
LNG	\$2.41	\$2.41	\$0.00	per DGE
Ethanol (E85)	\$1.84	\$1.99	\$0.15	per gallon
Propane**	\$2.77	\$2.76	-\$0.01	per gallon
Biodiesel (B20)	\$2.23	\$2.54	\$0.31	per gallon
Biodiesel (B99/B100)	\$2.81	\$3.03	\$0.22	per gallon

\*Includes public and private stations

\*\*Includes primary and secondary stations

Fuel Type	Per Gasoline Gallon Equivalent (\$/GGE)	Per Diesel Gallon Equivalent (\$/DGE)	Per Million British Thermal Units (\$/MBtu)
Gasoline (E10)	\$2.26	\$2.55	\$19.77
Diesel	\$2.19	\$2.46	\$19.11
CNG	\$2.05	\$2.32	\$17.94
LNG	\$2.15	\$2.41	\$16.71
Ethanol (E85)	\$2.59	\$2.92	\$29.57
Propane**	\$3.79	\$4.26	\$45.39
Biodiesel (B20)	\$2.28	\$2.59	\$18.04
Biodiesel (B99/B100)	\$2.97	\$3.33	\$25.36

\*Includes public and private stations

\*\*Includes primary and secondary stations

Liquid fuels have differing energy contents per gallon, so the price paid per unit of energy content can differ somewhat from the price paid per gallon. Table 3 shows fuel prices from Table 2 normalized to an energy-equivalent basis.

Note that, for the alternative fuels, prices on an energy-equivalent basis, ie, \$/GGE or \$/DGE, are generally higher than the prices per gallon, due to their lower energy content.<sup>5</sup>

Propane prices include information from both “primary” and “secondary” stations. Primary stations have dedicated vehicle services and tend to be less expensive than secondary stations, which mostly serve the propane tank and bottle market.

Prices for Table 3 were calculated using the nominal lower heating values in BTUs per gallon of fuel from the Oak Ridge National Laboratory’s Transportation Energy Data Book.<sup>6</sup>

<sup>4</sup> A very small sample (7 points) of hydrogen information was received, with an average price of \$13.68/GGE.

<sup>5</sup> For ethanol flexible-fuel vehicles (FFVs), the actual difference in fuel used per mile is somewhat less than would be calculated simply on the difference in energy content of the fuels. Some sources have noted that some FFVs can achieve better energy efficiency (miles per unit of energy) on E85 than on gasoline. This effect is not currently included in these calculations as the magnitude of the effect varies by specific FFV model.

<sup>6</sup> <http://cta.ornl.gov/data> A listing of the conversion factors used appears as an appendix at the end of this report.

## Gasoline and Diesel Prices: Clean Cities and EIA Data

Table 4, below, shows gasoline and diesel prices submitted by Clean Cities coordinators, fuel providers, and other stakeholders on a voluntary basis, between July 1 and July 15, 2016, compared to prices from the petroleum information section of the Energy Information Administration (EIA) website, for the week of July 4, 2016.

Clean Cities prices for conventional fuels were obtained from retail stations providing alternative fuel price information, or from nearby stations, so data collection was not uniform across the regions of the country; however, the information is representative of refueling stations selling both alternative fuels and conventional fuels.

The EIA data shows weekly average prices from a sample of approximately 800 retail gasoline and 400 retail diesel outlets across the country. The EIA data points are weighted to reflect the quantity of fuel being sold at that price.

The Clean Cities data is not weighted, and represents simple averages of reported prices. While there is some variation, the EIA average prices match relatively closely with the average prices reported by Clean Cities coordinators.

TABLE 4 Average Retail Gasoline and Diesel Prices by Region, in \$/gal from Clean Cities and EIA* Sources						
Region	GASOLINE PRICES			DIESEL PRICES		
	Clean Cities	EIA**	Difference***	Clean Cities	EIA**	Difference***
New England	\$2.38	\$2.32	\$0.06	\$2.56	\$2.48	\$0.08
Central Atlantic	\$2.27	\$2.30	-\$0.03	\$2.83	\$2.54	\$0.29
Lower Atlantic	\$2.16	\$2.15	\$0.01	\$2.28	\$2.36	-\$0.08
Midwest	\$2.13	\$2.21	-\$0.08	\$2.28	\$2.39	-\$0.11
Gulf Coast	\$2.01	\$2.07	-\$0.06	\$2.15	\$2.28	-\$0.13
Rocky Mountain	\$2.25	\$2.31	-\$0.06	\$2.31	\$2.44	-\$0.13
West Coast	\$2.73	\$2.76	-\$0.03	\$2.75	\$2.71	\$0.04
<b>NATIONAL AVERAGE</b>	<b>\$2.26</b>	<b>\$2.29</b>	<b>-\$0.03</b>	<b>\$2.46</b>	<b>\$2.42</b>	<b>\$0.04</b>

\*EIA = Energy Information Administration

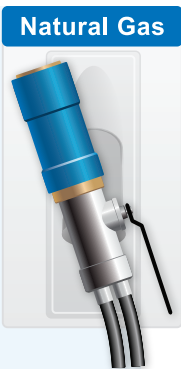
\*\*EIA prices are from the petroleum information section of the EIA website, week of 07/04/2016

[http://www.eia.gov/dnav/pet/xls/PET\\_PRI\\_GND\\_A\\_EPMR\\_PTE\\_DPGAL\\_W.xls](http://www.eia.gov/dnav/pet/xls/PET_PRI_GND_A_EPMR_PTE_DPGAL_W.xls)

[http://www.eia.gov/dnav/pet/xls/PET\\_PRI\\_GND\\_A\\_EPD2D\\_PTE\\_DPGAL\\_W.xls](http://www.eia.gov/dnav/pet/xls/PET_PRI_GND_A_EPD2D_PTE_DPGAL_W.xls)

\*\*\*Negative numbers represent average Clean Cities prices that are lower than EIA prices.

# Compressed Natural Gas (Relative to Gasoline)



The prices shown in Table 5 were submitted by Clean Cities coordinators, fuel providers, and other stakeholders on a voluntary basis, between July 1 and July 15, 2016.

Region	CNG Prices (\$/GGE*)	Gasoline Prices (\$/gal)	Price Difference**
New England	\$2.57	\$2.38	\$0.19
Central Atlantic	\$2.03	\$2.27	-\$0.24
Lower Atlantic	\$1.94	\$2.16	-\$0.22
Midwest	\$1.88	\$2.13	-\$0.25
Gulf Coast	\$1.99	\$2.01	-\$0.02
Rocky Mountain	\$1.87	\$2.25	-\$0.38
West Coast	\$2.36	\$2.73	-\$0.37
<b>NATIONAL AVERAGE</b>	<b>\$2.05</b>	<b>\$2.26</b>	<b>-\$0.21</b>

\*GGE = gasoline gallon equivalent

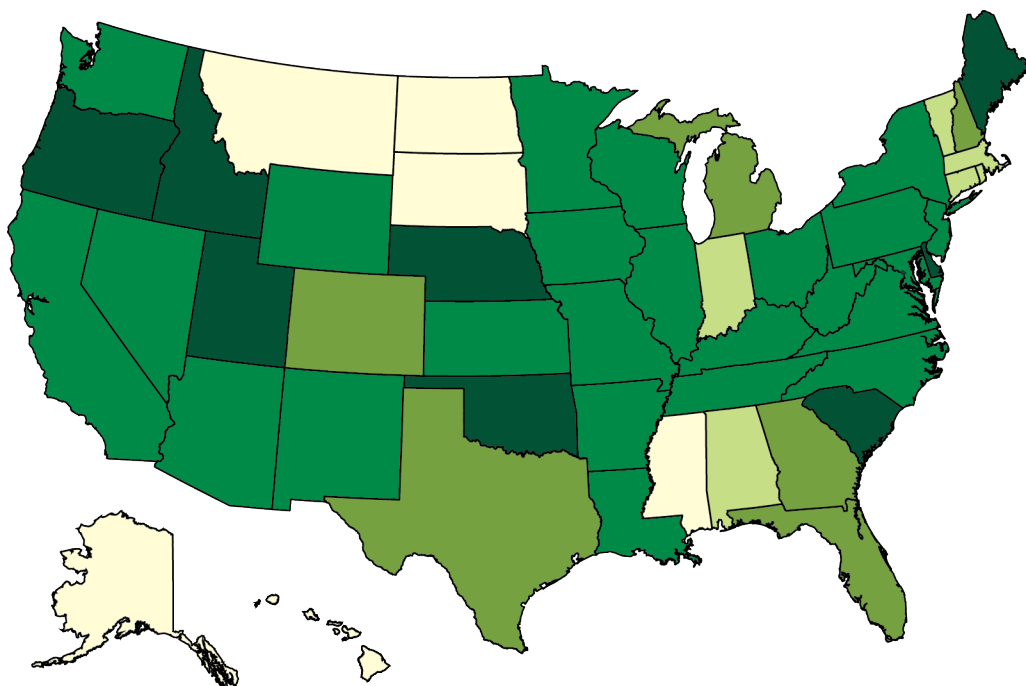
\*\*Negative numbers represent average CNG prices that are lower than gasoline, on a \$/GGE basis.

CNG prices in Table 5 were obtained from the “price at the pump,” given in \$/gasoline gallon equivalent (GGE), and averaged for each region.

As with other fuels, the energy content of natural gas can vary. CNG dispensers are calibrated for local gas compositions and dispense an accurate GGE for the actual gas being sold.

On average, during this reporting period, CNG cost about \$0.21 less than gasoline on a per gasoline gallon equivalent (GGE) basis.

Note: The Alternative Fuel Price Report is a snapshot in time of retail fuel prices. Alternative fuel fleets can obtain significantly lower fuel prices than those reported in the AFPR by entering into contracts directly with local fuel suppliers. Contract prices will vary, depending on fleet size and amount of fuel to be purchased, distance from the supplier, region of the country and other factors.



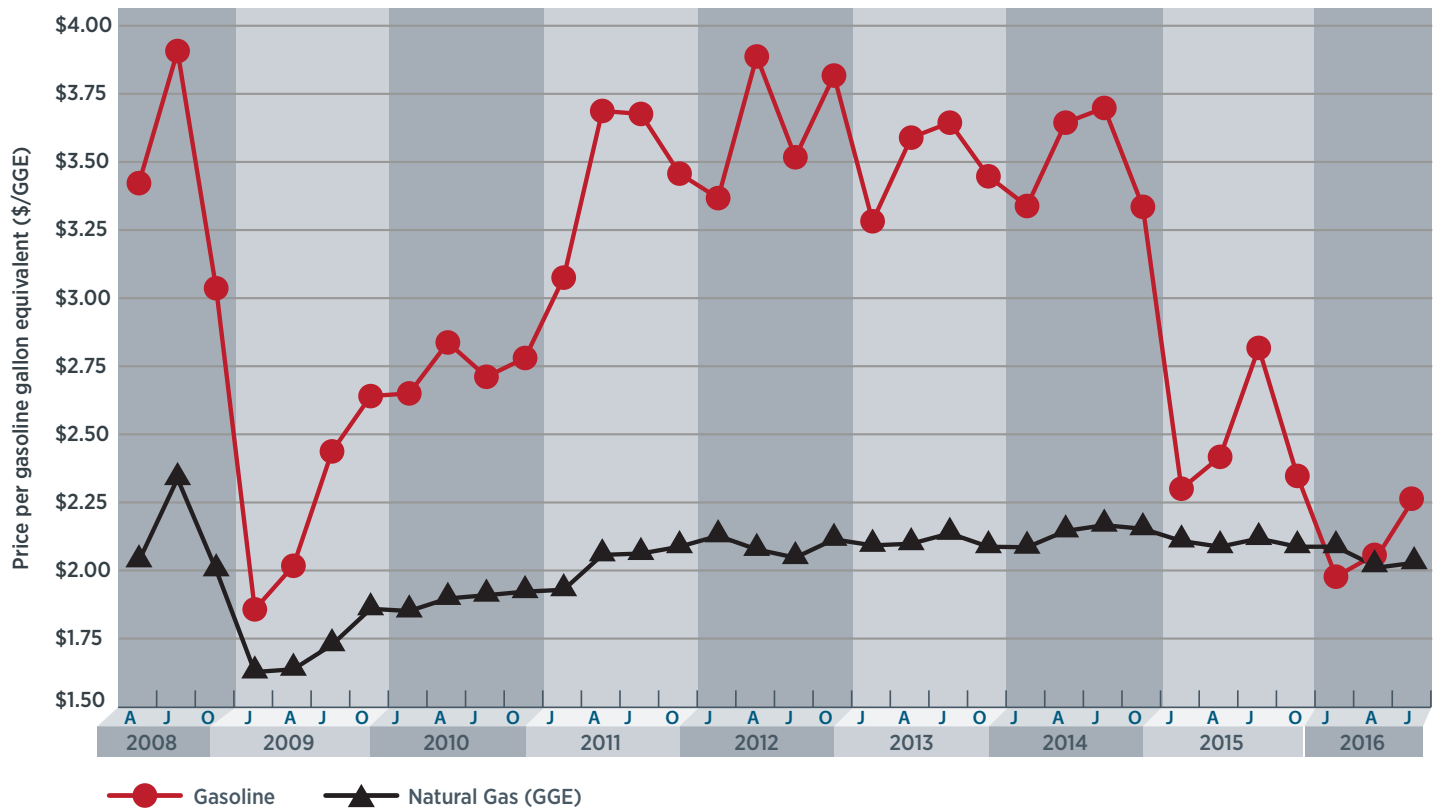
In this map, negative numbers represent prices for CNG that are lower than gasoline, on a per gasoline gallon equivalent basis. States not highlighted with a color did not have any CNG data points in the current report.

### CNG Price Difference Relative to Gasoline

- \$1.00 to -\$0.50
- \$0.49 to \$0.00
- \$0.01 to \$0.20
- \$0.21 to \$0.60
- Insufficient Data

**FIGURE 2  
PRICE DIFFERENTIALS BY STATE FOR COMPRESSED NATURAL GAS (CNG)  
RELATIVE TO GASOLINE**

## Compressed Natural Gas (CNG), cont.



**FIGURE 3**  
**HISTORICAL COMPRESSED NATURAL GAS (CNG) PRICES VERSUS GASOLINE**

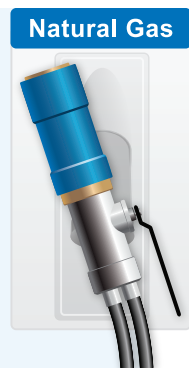


## Compressed Natural Gas (Relative to Diesel)

Region	CNG Prices (\$/DGE*)	Diesel Prices (\$/gal)	Price Difference**
New England	\$2.91	\$2.56	\$0.35
Central Atlantic	\$2.29	\$2.83	-\$0.54
Lower Atlantic	\$2.20	\$2.28	-\$0.08
Midwest	\$2.13	\$2.28	-\$0.15
Gulf Coast	\$2.25	\$2.15	\$0.10
Rocky Mountain	\$2.11	\$2.31	-\$0.20
West Coast	\$2.67	\$2.75	-\$0.08
<b>NATIONAL AVERAGE</b>	<b>\$2.32</b>	<b>\$2.46</b>	<b>-\$0.14</b>

\*DGE = diesel gallon equivalent

\*\* Negative numbers represent average CNG prices that are lower than diesel, on a \$/DGE basis.



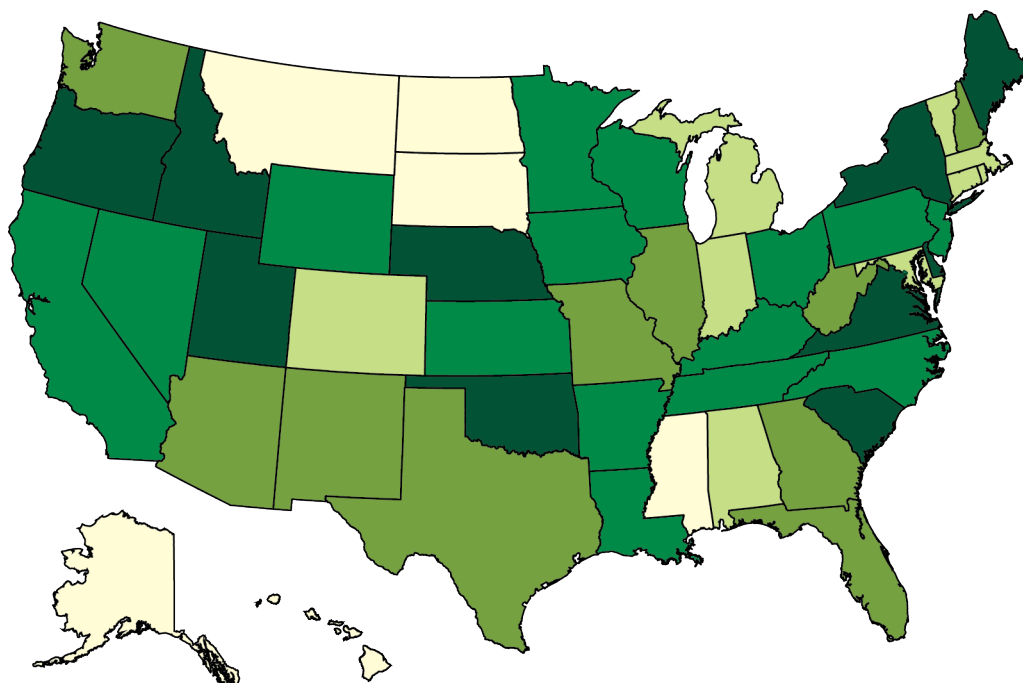
The prices shown in Table 6 were submitted by Clean Cities coordinators, fuel providers, and other stakeholders on a voluntary basis, between July 1 and July 15, 2016.

Table 6 shows the prices from Table 5, converted to \$/diesel gallon equivalent (\$/DGE), for easy comparison with diesel prices.

As with other fuels, the energy content of natural gas can vary. CNG dispensers are calibrated for local gas compositions and dispense an accurate GGE for the actual gas being sold.

On average, during this reporting period, CNG cost about \$0.14 less than diesel on a per diesel gallon equivalent basis.

**Note:** The Alternative Fuel Price Report is a snapshot in time of retail fuel prices. Alternative fuel fleets can obtain significantly lower fuel prices than those reported in the AFPR by entering into contracts directly with local fuel suppliers. Contract prices will vary, depending on fleet size and amount of fuel to be purchased, distance from the supplier, region of the country and other factors.



In this map, negative numbers represent prices for CNG that are lower than diesel, on a per diesel gallon equivalent basis. States not highlighted with a color did not have any CNG data points in the current report.

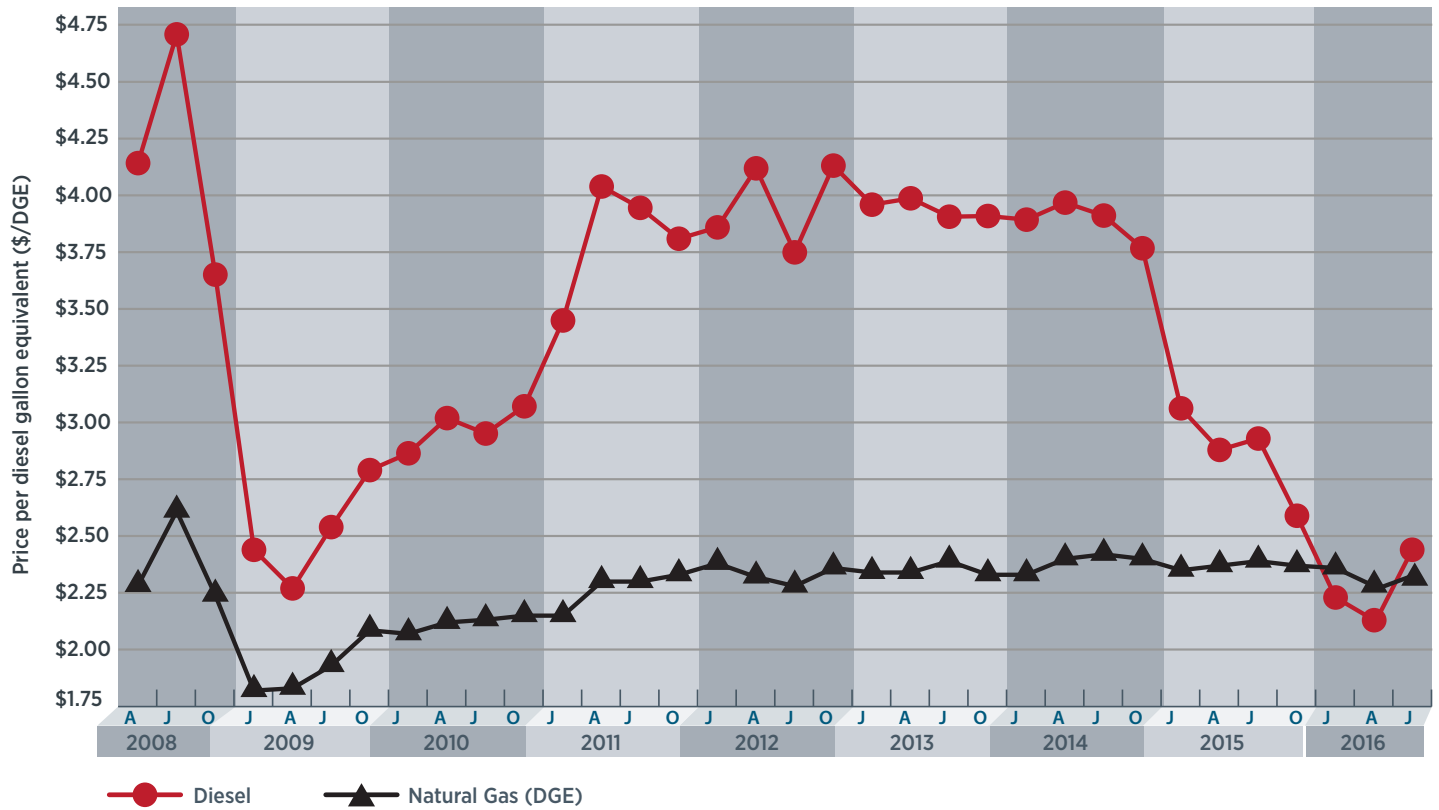
### CNG Price Difference Relative to Diesel

- \$1.15 to -\$0.70
- \$0.69 to -\$0.30
- \$0.29 to \$0.00
- \$0.01 to \$0.50
- Insufficient Data

**FIGURE 4**  
PRICE DIFFERENTIALS BY STATE FOR COMPRESSED NATURAL GAS (CNG) RELATIVE TO DIESEL



# Compressed Natural Gas (CNG), cont.



**FIGURE 5**  
**HISTORICAL COMPRESSED NATURAL GAS (CNG) PRICES VERSUS DIESEL**

# Liquefied Natural Gas (LNG)

Region	LNG Prices (\$/DGE*)	Diesel Prices (\$/gal)	Price Difference**
New England	\$2.75	\$2.56	\$0.19
Central Atlantic	---	\$2.83	---
Lower Atlantic	\$2.26	\$2.28	-\$0.02
Midwest	\$2.63	\$2.28	\$0.35
Gulf Coast	\$2.36	\$2.15	\$0.21
Rocky Mountain	\$2.54	\$2.31	\$0.23
West Coast	\$2.29	\$2.75	-\$0.46
<b>NATIONAL AVERAGE</b>	<b>\$2.41</b>	<b>\$2.46</b>	<b>-\$0.05</b>

\*DGE = diesel gallon equivalent  
 \*\* Negative numbers represent average LNG prices that are lower than diesel, on a \$/DGE basis.

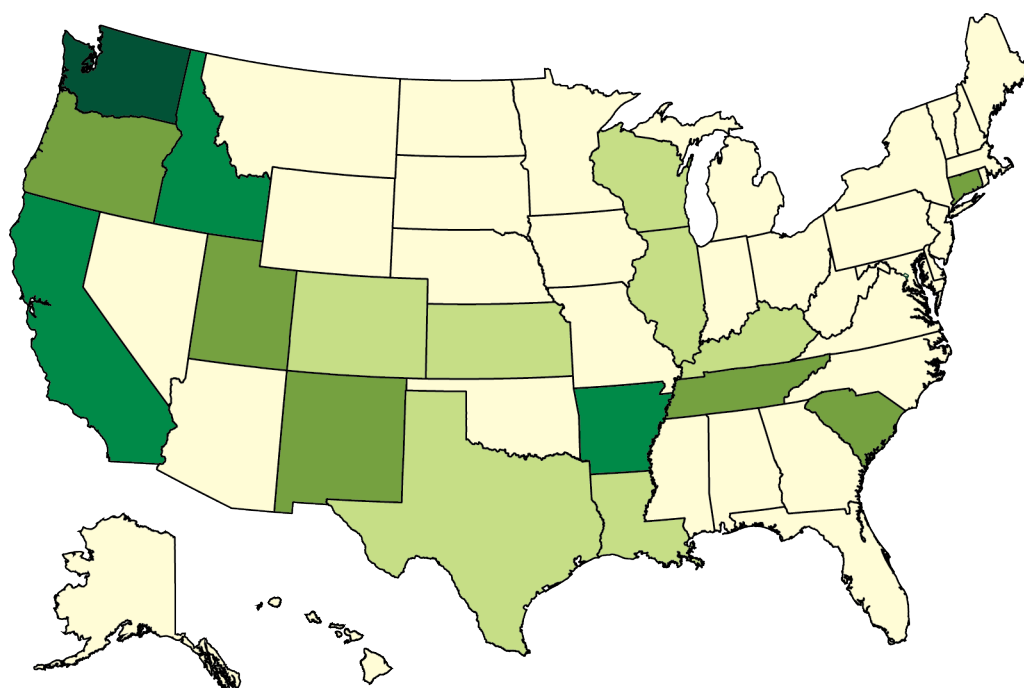


The prices shown in Table 7 were submitted by Clean Cities coordinators, fuel providers, and other stakeholders on a voluntary basis, between July 1 and July 15, 2016.

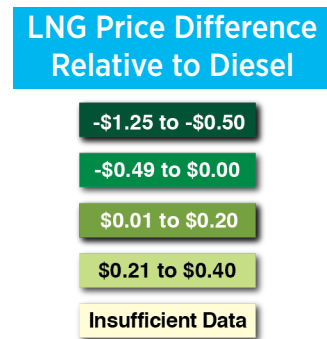
LNG prices in Table 7 were obtained from the “price at the pump,” given in \$/diesel gallon equivalent (DGE), and averaged for each region.

As with other fuels, the energy content of natural gas can vary. LNG dispensers are calibrated for local gas compositions and dispense an accurate DGE for the actual gas being sold.

On average, during this reporting period, LNG cost about \$0.05 less than gasoline on a per diesel gallon equivalent (DGE) basis.

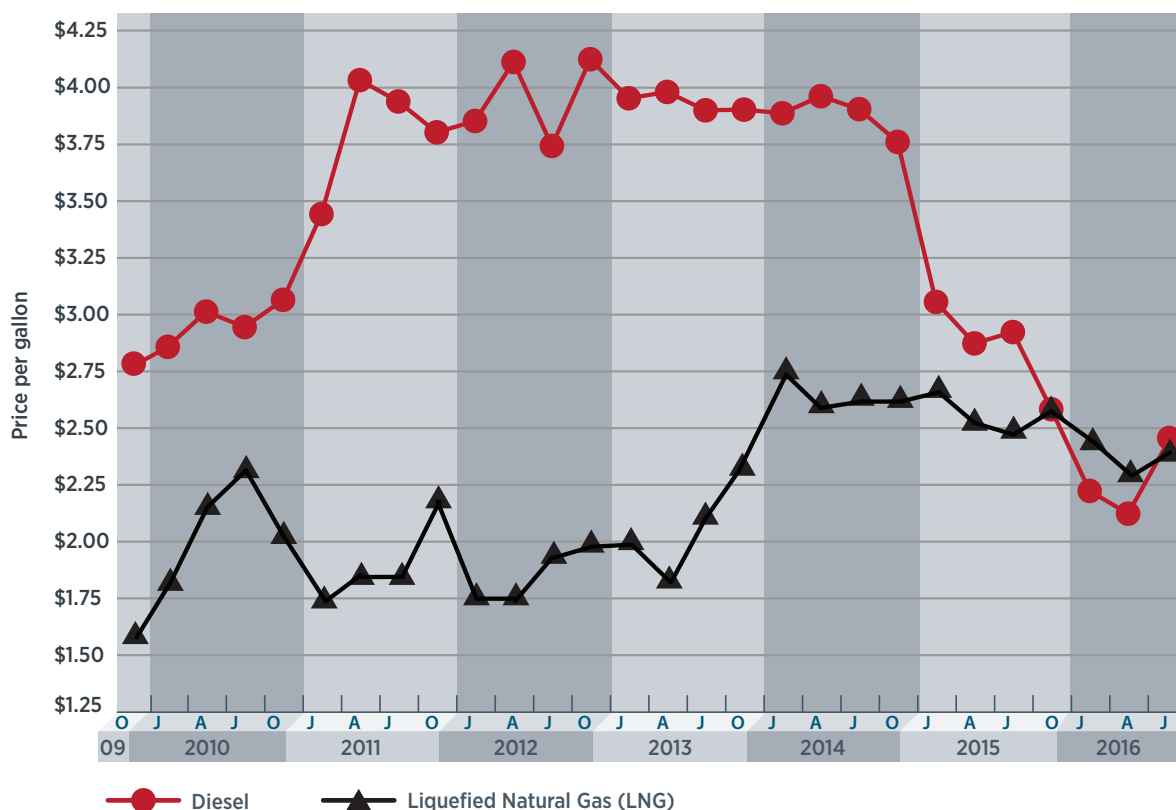


In this map, negative numbers represent prices for LNG that are lower than diesel, on a per gallon basis. States not highlighted with a color did not have any LNG data points in the current report.



**FIGURE 6**  
**PRICE DIFFERENTIALS BY STATE FOR LNG RELATIVE TO DIESEL**

## Liquefied Natural Gas (LNG), cont.



**FIGURE 7**  
**HISTORICAL LIQUEFIED NATURAL GAS (LNG) PRICES VERSUS DIESEL**

**NOTE:** While LNG data has not previously been shown in a separate section in this report, we do have a record of historical prices submitted by Clean Cities coordinators, dating from January 2009, when 5 data points were submitted. We have, therefore, included Figure 7, showing historical LNG vs. Diesel prices, as well as Table 12d, comparing LNG prices submitted in July 2016 and April 2016.

# Ethanol (E85)

**TABLE 8**  
Ethanol (E85) and Gasoline Average Retail Prices by Region

Region	E85 Prices (\$/gal)	Gasoline Prices (\$/gal)	Price Difference*
New England	\$2.55	\$2.38	\$0.17
Central Atlantic	\$2.29	\$2.27	\$0.02
Lower Atlantic	\$1.94	\$2.16	-\$0.22
Midwest	\$1.84	\$2.13	-\$0.29
Gulf Coast	\$1.84	\$2.01	-\$0.17
Rocky Mountain	\$2.00	\$2.25	-\$0.25
West Coast	\$2.40	\$2.73	-\$0.33
<b>NATIONAL AVERAGE</b>	<b>\$1.99</b>	<b>\$2.26</b>	<b>-\$0.27</b>

\*Negative numbers represent average E85 prices that are lower than gasoline, on a \$/gal basis.

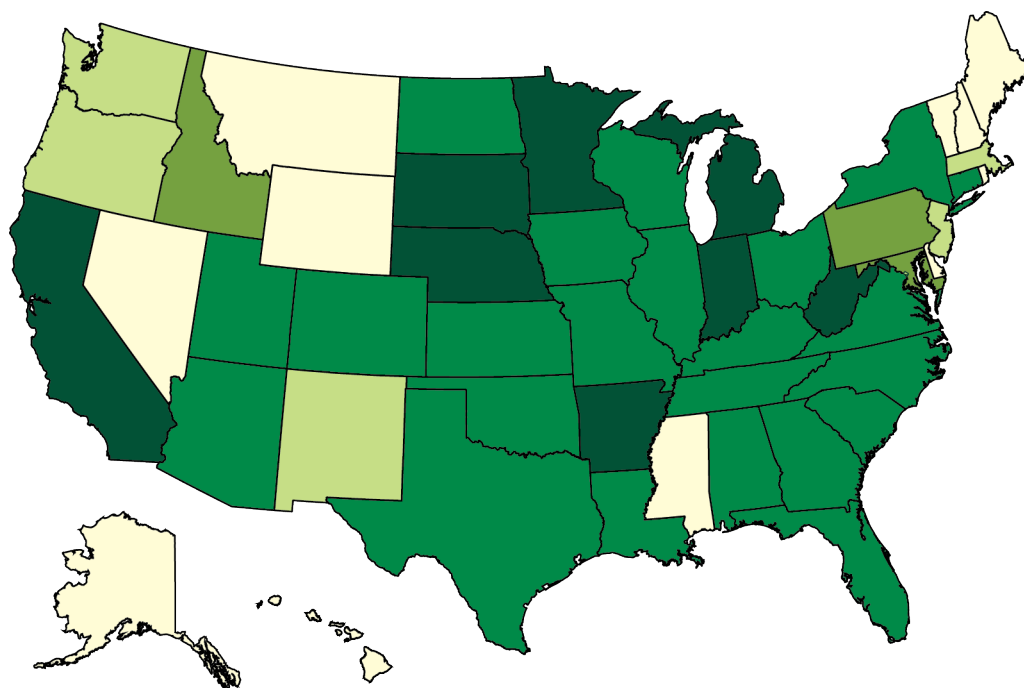


The prices shown in Table 8 were submitted by Clean Cities coordinators, fuel providers, and other stakeholders on a voluntary basis, between July 1 and July 15, 2016.

Most gasoline available throughout the United States today is a blend of 90% gasoline and up to 10% ethanol, or E10. Additionally, the E85 that is sold in the United States today actually contains, on average, approximately 70% ethanol.

E85 energy content for this report is therefore calculated as (.70)(E100 energy content) + (.30)(E0 energy content), to more closely reflect the actual energy content of E85 fuel available today.

On average, during this reporting period, E85 cost about \$0.27 less than gasoline on a per gallon basis.



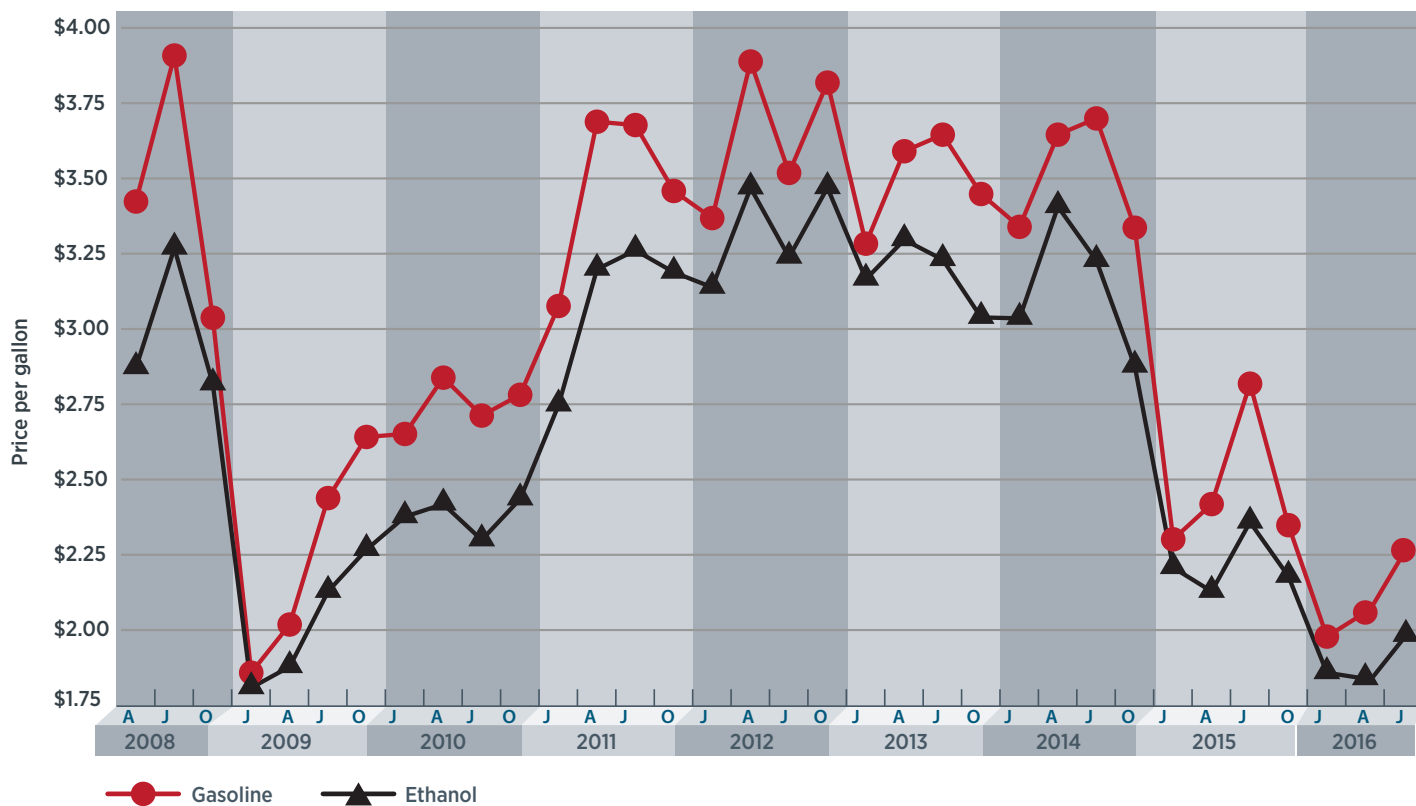
In this map, negative numbers represent prices for E85 that are lower than gasoline, on a per gallon basis. States not highlighted with a color did not have any E85 data points in the current report.

### E85 Price Difference Relative to Gasoline

- \$0.65 to -\$0.40
- \$0.39 to \$0.00
- \$0.01 to \$0.15
- \$0.16 to \$0.37
- Insufficient Data

**FIGURE 8**  
PRICE DIFFERENTIALS BY STATE FOR E85 RELATIVE TO GASOLINE

# Ethanol (E85), cont.



**FIGURE 9**  
**HISTORICAL ETHANOL (E85) PRICES VERSUS GASOLINE**

# Propane (LPG)



The prices shown in Table 9 were submitted by Clean Cities coordinators, fuel providers, and other stakeholders on a voluntary basis, between July 1 and July 15, 2016.

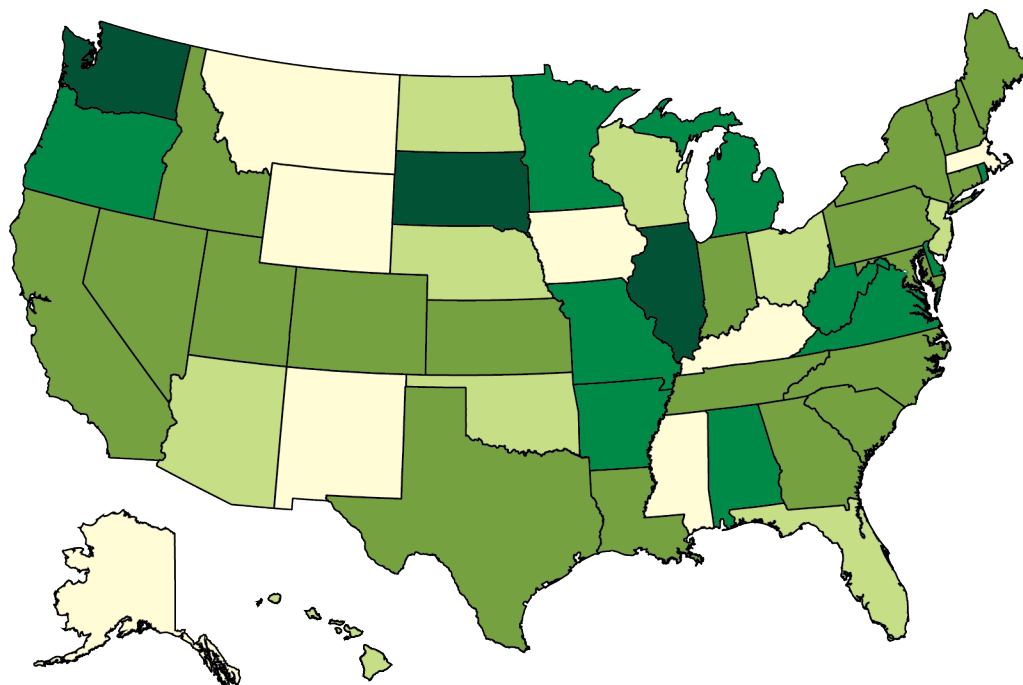
Region	LPG Prices (\$/gal)	Gasoline Prices (\$/gal)	Price Difference*
New England	\$2.98	\$2.38	\$0.60
Central Atlantic	\$2.60	\$2.27	\$0.33
Lower Atlantic	\$2.88	\$2.16	\$0.72
Midwest	\$2.60	\$2.13	\$0.47
Gulf Coast	\$2.58	\$2.01	\$0.57
Rocky Mountain	\$2.81	\$2.25	\$0.56
West Coast	\$2.95	\$2.73	\$0.22
<b>NATIONAL AVERAGE</b>	<b>\$2.76</b>	<b>\$2.26</b>	<b>\$0.50</b>

\*Negative numbers represent average propane prices that are lower than gasoline, on a \$/gal basis.

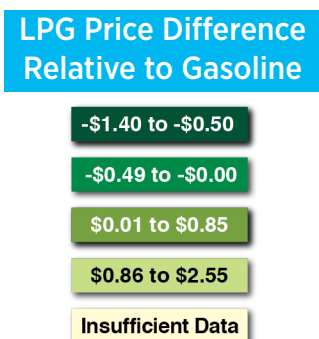
Propane prices in this report are from both private fleet refueling stations and public refueling sites that can provide propane for vehicles and for other uses.<sup>7</sup>

Note: The Alternative Fuel Price Report is a snapshot in time of retail fuel prices. Alternative fuel fleets can obtain significantly lower fuel prices than those reported in the AFPR by entering into contracts directly with local fuel suppliers. Contract prices will vary, depending on fleet size and amount of fuel to be purchased, distance from the supplier, region of the country and other factors.

On average, during this reporting period, propane cost about \$0.51 more than gasoline on a per (liquid) gallon basis.



In this map, negative numbers represent prices for propane that are lower than gasoline, on a per gallon basis. States not highlighted with a color did not have any propane data points in the current report.



**FIGURE 10**  
PRICE DIFFERENTIALS BY STATE FOR PROPANE (LPG) RELATIVE TO GASOLINE

<sup>7</sup> Because many propane retailers provide fuel for non-vehicle uses (camping stoves, gas grills, etc.), the National Renewable Energy Laboratory (NREL) has worked with suppliers to clarify the differences. On the AFDC Station Locator website (<http://www.afdc.energy.gov/locator/stations/>) each public propane station is designated as a “primary” or “secondary” service type. Both types are able to fuel vehicles; however, stations designated as “primary” have indicated they have facilities and billing procedures specifically designed for vehicle customers. They may also offer special vehicle pricing and most accept major credit cards, similar to traditional gasoline/diesel retailers. Propane pricing reported in this guide reflects a sampling of both primary and secondary

Propane (LPG), cont.

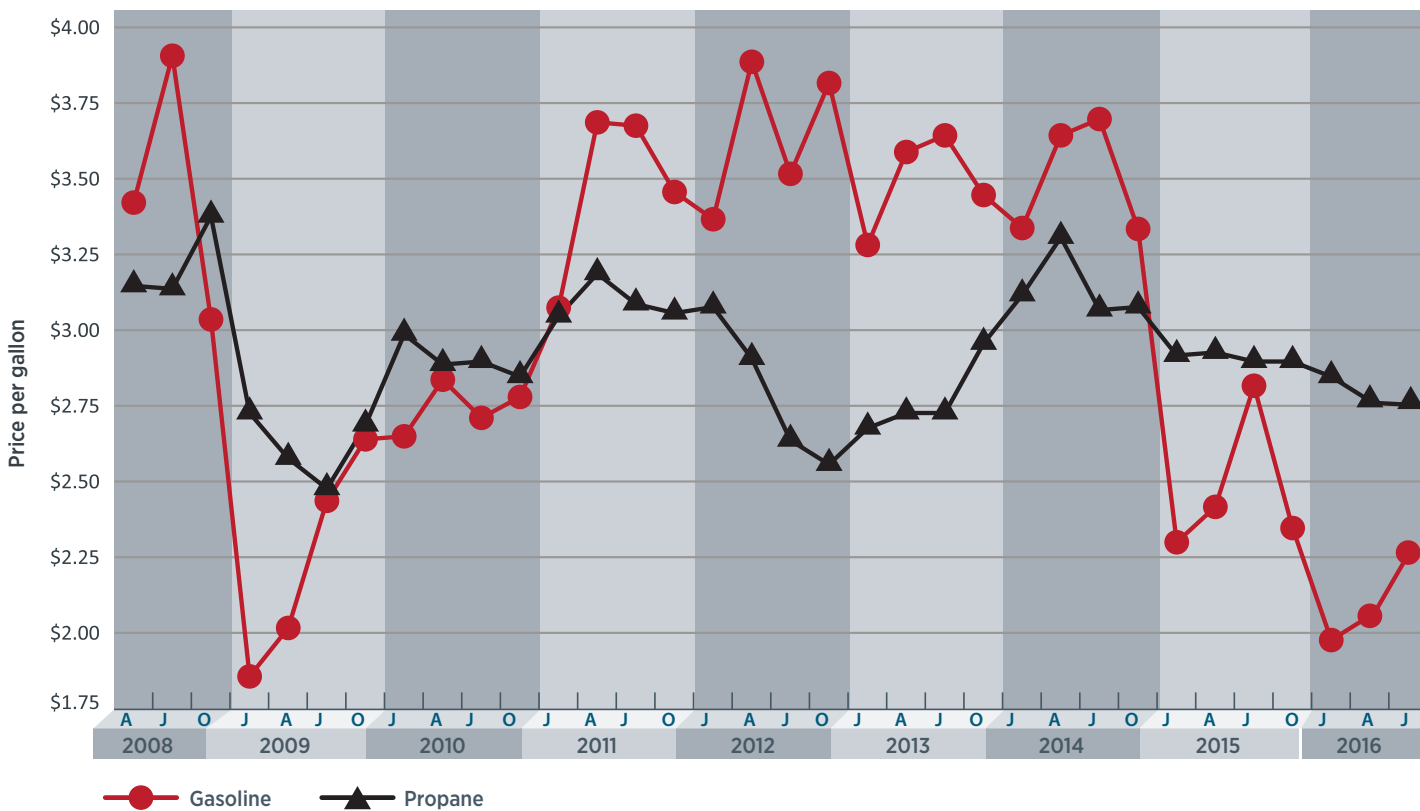
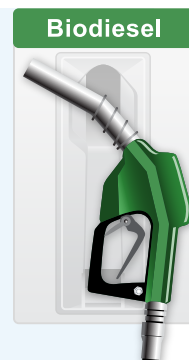


FIGURE 11  
HISTORICAL PROPANE (LPG) PRICES VERSUS GASOLINE



# Biodiesel Blends: B20



The prices shown in Table 10 were submitted by Clean Cities coordinators, fuel providers, and other stakeholders on a voluntary basis, between July 1 and July 15, 2016.

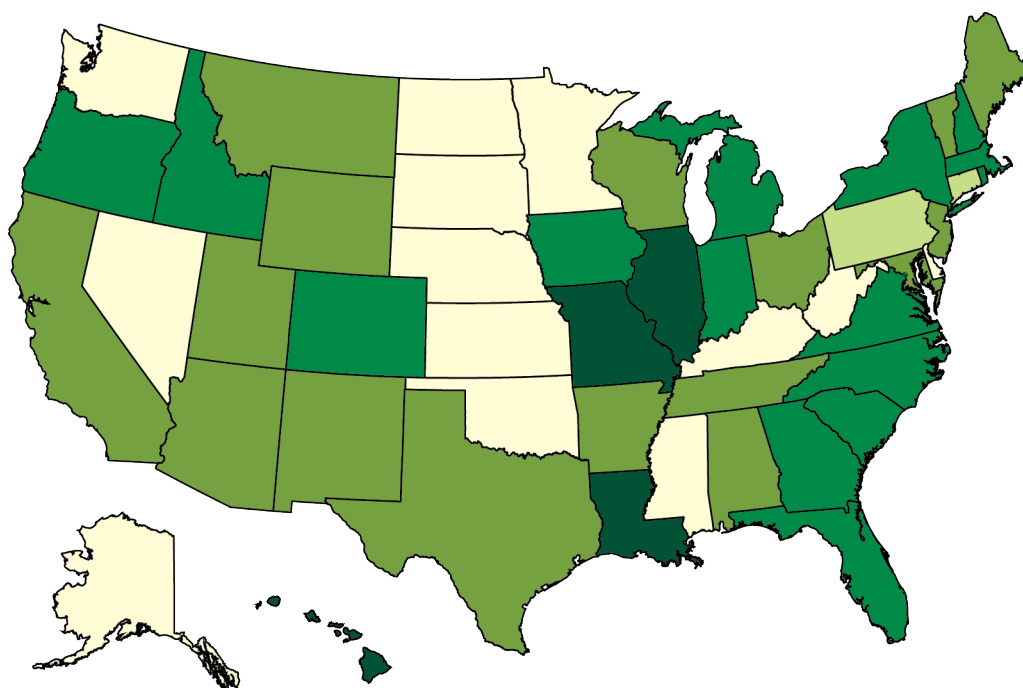
Region	B20 Prices (\$/gal)	Diesel Prices (\$/gal)	Price Difference*
New England	\$2.62	\$2.56	\$0.06
Central Atlantic	\$2.68	\$2.83	-\$0.15
Lower Atlantic	\$2.20	\$2.28	-\$0.08
Midwest	\$2.42	\$2.28	\$0.14
Gulf Coast	\$2.34	\$2.15	\$0.19
Rocky Mountain	\$2.43	\$2.31	\$0.12
West Coast	\$2.83	\$2.75	\$0.08
<b>NATIONAL AVERAGE</b>	<b>\$2.54</b>	<b>\$2.46</b>	<b>\$0.08</b>

\*Negative numbers represent average B20 prices that are lower than diesel, on a \$/GAL basis.

B20 is a blend of 20% biodiesel and 80% conventional diesel. B20 contains only about 2% less energy (BTUs) per volume than 100% diesel. The appendix at the end of this report provides conversion factors for calculating B20 prices on a GGE and DGE basis.

Note that B20 prices, in many regions, track closely with diesel prices.

On a national average basis, during this reporting period, B20 cost about \$0.08 more than diesel on a per gallon basis.



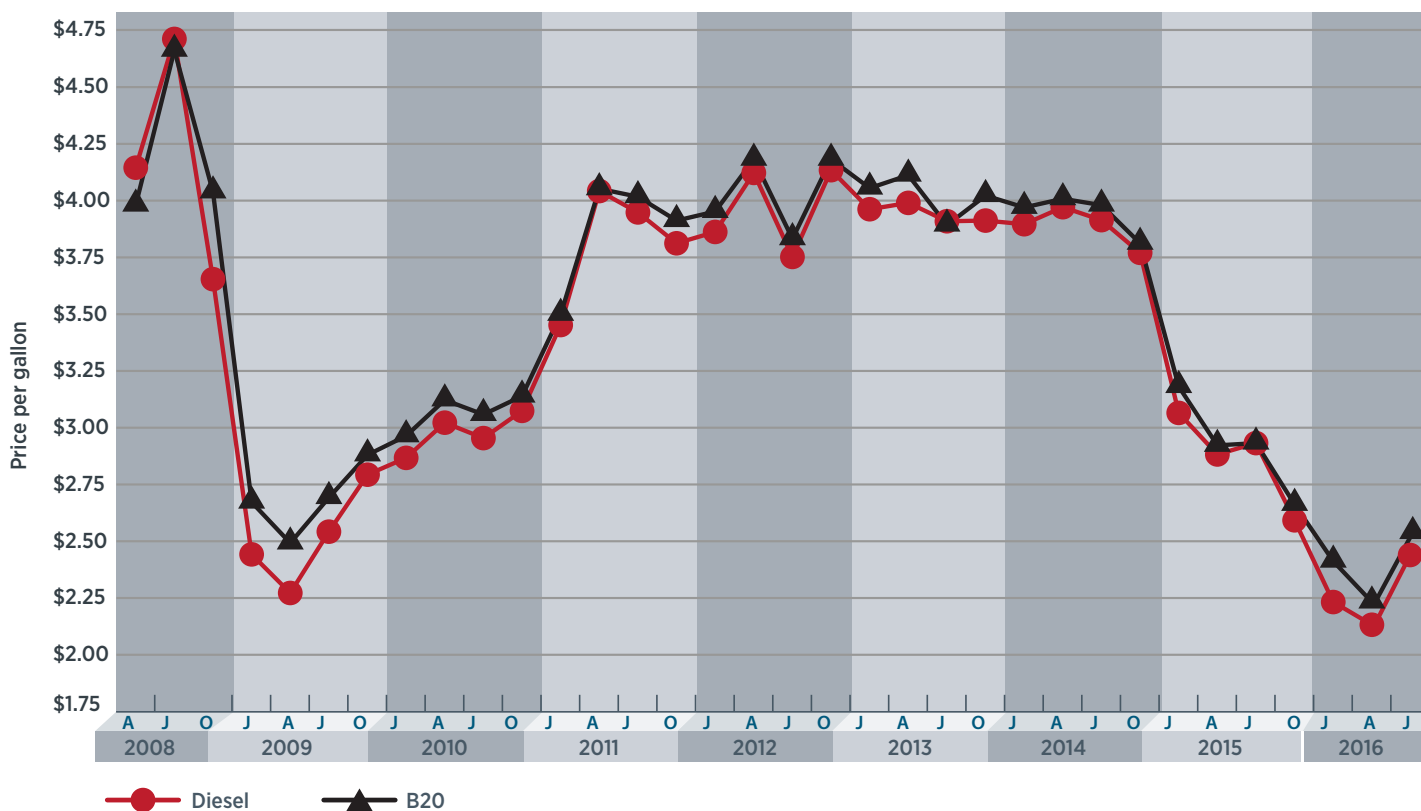
**B20 Price Difference Relative to Diesel**

- \$0.60 to -\$0.25
- \$0.24 to \$0.00
- \$0.01 to \$0.35
- \$0.36 to \$1.81
- Insufficient Data

In this map, negative numbers represent prices for B20 that are lower than diesel, on a per gallon basis. States not highlighted with a color did not have any B20 data points in the current report.

**FIGURE 12  
PRICE DIFFERENTIALS BY STATE FOR B20 RELATIVE TO DIESEL**

## Biodiesel Blends: B20, cont.

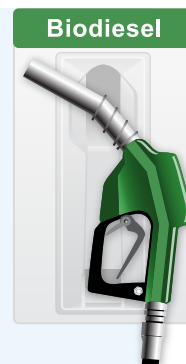


**FIGURE 13**  
HISTORICAL B20 PRICES VERSUS DIESEL

## Biodiesel Blends: B99/B100

Region	B99/B100 Prices (\$/gal)	Diesel Prices (\$/gal)	Price Difference*
New England	\$2.22	\$2.56	-\$0.34
Central Atlantic	\$2.55	\$2.83	-\$0.28
Lower Atlantic	\$3.14	\$2.28	\$0.86
Midwest	---	\$2.28	---
Gulf Coast	\$2.17	\$2.15	\$0.02
Rocky Mountain	---	\$2.31	---
West Coast	\$3.26	\$2.75	\$0.51
<b>NATIONAL AVERAGE</b>	<b>\$3.03</b>	<b>\$2.46</b>	<b>\$0.57</b>

\*Negative numbers represent average B99/B100 prices that are lower than diesel, on a \$/GAL basis.

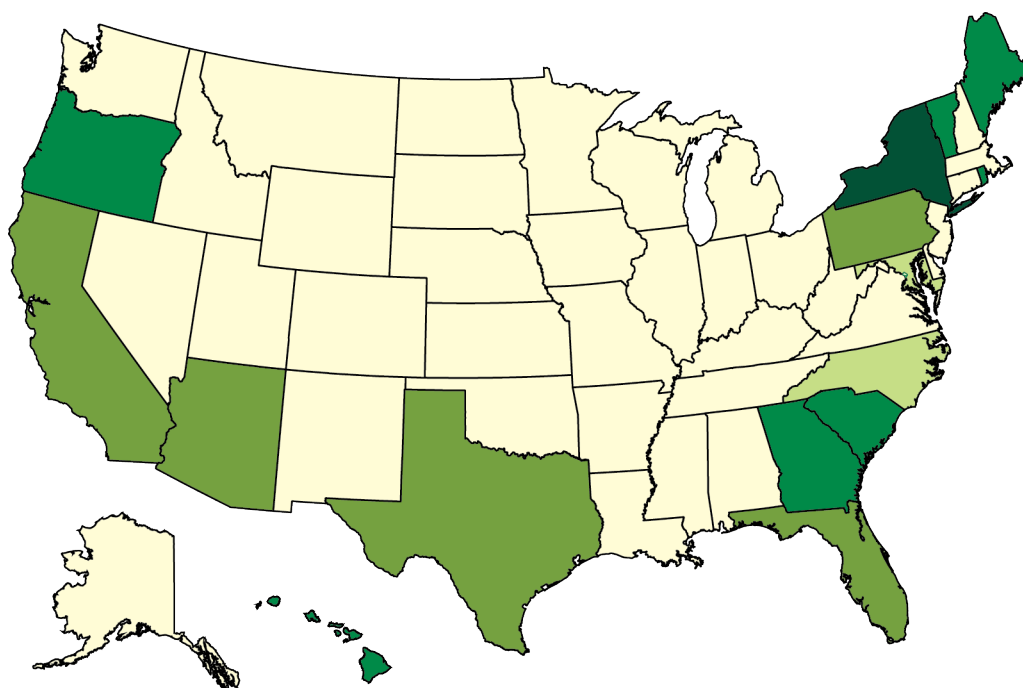


The prices shown in Table 11 were submitted by Clean Cities coordinators, fuel providers, and other stakeholders on a voluntary basis, between July 1 and July 15, 2016.

B100 contains about 10% less energy (BTUs) per volume than 100% diesel.

The appendix at the end of this report provides conversion factors for calculating B100 prices on a GGE and DGE basis.

On average, during this reporting period, B99/B100 cost about \$0.57 more than diesel on a per gallon basis.

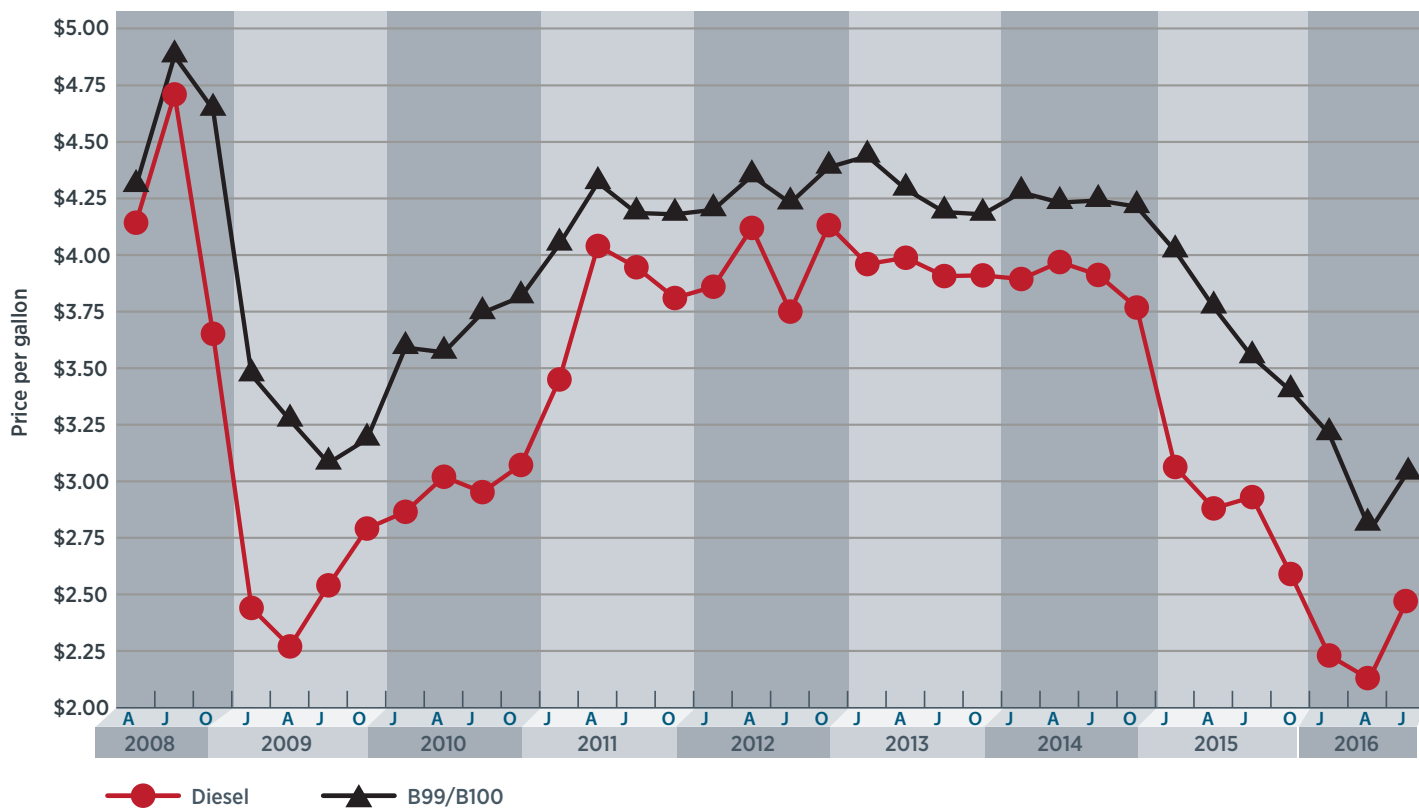


In this map, negative numbers represent prices for B99/B100 that are lower than diesel, on a per gallon basis. States not highlighted with a color did not have any B99/B100 data points in the current report.



**FIGURE 14**  
PRICE DIFFERENTIALS BY STATE FOR B99/B100 RELATIVE TO DIESEL

## Biodiesel Blends: B99/B100, cont.



**FIGURE 15**  
**HISTORICAL B99/B100 PRICES VERSUS DIESEL**

## Comparison Of Prices: This Report Versus Last Report

The following tables summarize the average retail prices submitted for this report by region, and compare them to prices submitted for the April 2016 Alternative Fuel Price Report. It should be noted that a portion of the price changes may be attributed to differing sample sizes and locations between the two reports.

### GASOLINE (\$ per gallon)



TABLE 12a				
Region	Price for April 2016	Price for July 2016	Difference in \$	Difference in %
New England	\$2.14	\$2.38	\$0.24	11.21%
Central Atlantic	\$2.07	\$2.27	\$0.20	9.66%
Lower Atlantic	\$1.97	\$2.16	\$0.19	9.64%
Midwest	\$1.93	\$2.13	\$0.20	10.36%
Gulf Coast	\$1.81	\$2.01	\$0.20	11.05%
Rocky Mountain	\$1.93	\$2.25	\$0.32	16.58%
West Coast	\$2.57	\$2.73	\$0.16	6.23%
<b>NATIONAL AVERAGE</b>	<b>\$2.06</b>	<b>\$2.26</b>	<b>\$0.20</b>	<b>9.71%</b>

TABLE 12b				
Region	Price for April 2016	Price for July 2016	Difference in \$	Difference in %
New England	\$2.33	\$2.56	\$0.23	9.87%
Central Atlantic	\$2.14	\$2.83	\$0.69	32.24%
Lower Atlantic	\$2.12	\$2.28	\$0.16	7.55%
Midwest	\$2.00	\$2.28	\$0.28	14.00%
Gulf Coast	\$1.88	\$2.15	\$0.27	14.36%
Rocky Mountain	\$1.97	\$2.31	\$0.34	17.26%
West Coast	\$2.42	\$2.75	\$0.33	13.64%
<b>NATIONAL AVERAGE</b>	<b>\$2.13</b>	<b>\$2.46</b>	<b>\$0.33</b>	<b>15.49%</b>

### DIESEL (\$ per gallon)

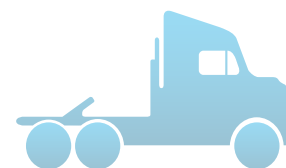


TABLE 12c				
Region	Price for April 2016	Price for July 2016	Difference in \$	Difference in %
New England	\$2.42	\$2.57	\$0.15	6.20%
Central Atlantic	\$1.87	\$2.03	\$0.16	8.56%
Lower Atlantic	\$1.88	\$1.94	\$0.06	3.19%
Midwest	\$1.91	\$1.88	-\$0.03	-1.57%
Gulf Coast	\$2.01	\$1.99	-\$0.02	-1.00%
Rocky Mountain	\$1.89	\$1.87	-\$0.02	-1.06%
West Coast	\$2.32	\$2.36	\$0.04	1.72%
<b>NATIONAL AVERAGE</b>	<b>\$2.02</b>	<b>\$2.05</b>	<b>\$0.03</b>	<b>1.49%</b>

### CNG (\$ per GGE)



TABLE 12d				
Region	Price for April 2016	Price for July 2016	Difference in \$	Difference in %
New England	\$2.79	\$2.75	-\$0.04	-1.43%
Central Atlantic	---	---	---	---
Lower Atlantic	\$2.29	\$2.26	-\$0.03	-1.31%
Midwest	\$2.27	\$2.63	\$0.36	15.86%
Gulf Coast	\$2.35	\$2.36	\$0.01	0.43%
Rocky Mountain	\$2.56	\$2.54	-\$0.02	-0.78%
West Coast	\$2.32	\$2.29	-\$0.03	-1.29%
<b>NATIONAL AVERAGE</b>	<b>\$2.39</b>	<b>\$2.41</b>	<b>\$0.02</b>	<b>0.84%</b>

### LNG (\$ per gallon)



## Comparison Of Prices: This Report Versus Last Report, cont.

Region	Price for April 2016	Price for July 2016	Difference in \$	Difference in %
New England	\$2.43	\$2.55	\$0.12	4.94%
Central Atlantic	\$2.11	\$2.29	\$0.18	8.53%
Lower Atlantic	\$1.91	\$1.94	\$0.03	1.57%
Midwest	\$1.66	\$1.84	\$0.18	10.84%
Gulf Coast	\$1.64	\$1.84	\$0.20	12.20%
Rocky Mountain	\$1.77	\$2.00	\$0.23	12.99%
West Coast	\$2.29	\$2.40	\$0.11	4.80%
<b>NATIONAL AVERAGE</b>	<b>\$1.84</b>	<b>\$1.99</b>	<b>\$0.15</b>	<b>8.15%</b>

**ETHANOL  
(E85)  
(\$ per gallon)**



**PROPANE  
(\$ per gallon)**



Region	Price for April 2016	Price for July 2016	Difference in \$	Difference in %
New England	\$2.89	\$2.98	\$0.09	3.11%
Central Atlantic	\$2.77	\$2.60	-\$0.17	-6.14%
Lower Atlantic	\$2.78	\$2.88	\$0.10	3.60%
Midwest	\$2.69	\$2.60	-\$0.09	-3.35%
Gulf Coast	\$2.57	\$2.58	\$0.01	0.39%
Rocky Mountain	\$2.82	\$2.81	-\$0.01	-0.35%
West Coast	\$2.94	\$2.95	\$0.01	0.34%
<b>NATIONAL AVERAGE</b>	<b>\$2.77</b>	<b>\$2.76</b>	<b>-\$0.01</b>	<b>-0.36%</b>

Region	Price for April 2016	Price for July 2016	Difference in \$	Difference in %
New England	\$2.36	\$2.62	\$0.26	11.02%
Central Atlantic	\$2.16	\$2.68	\$0.52	24.07%
Lower Atlantic	\$2.14	\$2.20	\$0.06	2.80%
Midwest	\$2.14	\$2.42	\$0.28	13.08%
Gulf Coast	\$2.16	\$2.34	\$0.18	8.33%
Rocky Mountain	\$2.04	\$2.43	\$0.39	19.12%
West Coast	\$2.49	\$2.83	\$0.34	13.65%
<b>NATIONAL AVERAGE</b>	<b>\$2.23</b>	<b>\$2.54</b>	<b>\$0.31</b>	<b>13.90%</b>

**BIODIESEL  
B20  
(\$ per gallon)**



**BIODIESEL  
B99/B100  
(\$ per gallon)**



Region	Price for April 2016	Price for July 2016	Difference in \$	Difference in %
New England	\$2.32	\$2.22	-\$0.10	-4.31%
Central Atlantic	\$2.65	\$2.55	-\$0.10	-3.77%
Lower Atlantic	\$2.44	\$3.14	\$0.70	28.69%
Midwest	---	---	---	---
Gulf Coast	\$2.32	\$2.17	-\$0.15	-6.47%
Rocky Mountain	---	---	---	---
West Coast	\$3.24	\$3.26	\$0.02	0.62%
<b>NATIONAL AVERAGE</b>	<b>\$2.81</b>	<b>\$3.03</b>	<b>\$0.22</b>	<b>7.83%</b>

## Price Comparison By Region For Public & Private Refueling Stations

The tables below summarize average retail fuel prices contained in this report, sorted by type of refueling station, i.e., “private” or “public”. The stations classified as “public” are open to the general public. The majority of the stations classified as “private” are operated by state or local government agencies, transit agencies, utility districts, colleges or universities, or military facilities. They serve the host agency’s fleets, and may have contractual or other arrangements in place to sell fuel to other government agencies and/or selected other fleets. In some cases, contracts may include billing, accounting, or fleet service management fees that are rolled into the price of the fuel.

For this report, there were 3,215 prices submitted from “public” refueling stations, and 356 prices submitted from “private” refueling stations, for a total of 3,571 prices. This includes a small number of data points that were submitted for alternative fuel blends that are not widely used, such as E15-E50, B5-B50, hydrogen and renewable diesel.

As with the other prices in this report, these prices include state and federal taxes, as described in the Methodology section of this document.

TABLE 13a - Gasoline		
Average Retail Price by Refueling Station Type (\$/gal)		
Region	Private	Public
New England	\$2.30	\$2.39
Central Atlantic	\$2.21	\$2.29
Lower Atlantic	\$2.08	\$2.16
Midwest	\$2.16	\$2.13
Gulf Coast	---	\$2.01
Rocky Mountain	---	\$2.25
West Coast	\$2.73	\$2.73
<b>NATIONAL AVERAGE</b>	<b>\$2.33</b>	<b>\$2.25</b>

TABLE 13b - Diesel		
Average Retail Price by Refueling Station Type (\$/gal)		
Region	Private	Public
New England	\$2.50	\$2.57
Central Atlantic	\$2.74	\$2.86
Lower Atlantic	\$2.24	\$2.28
Midwest	\$2.04	\$2.30
Gulf Coast	---	\$2.15
Rocky Mountain	---	\$2.31
West Coast	\$2.64	\$2.76
<b>NATIONAL AVERAGE</b>	<b>\$2.55</b>	<b>\$2.45</b>

TABLE 13c - CNG		
Average Retail Price by Refueling Station Type (\$/GGE)		
Region	Private	Public
New England	\$2.12	\$2.63
Central Atlantic	\$1.78	\$2.14
Lower Atlantic	\$1.00	\$2.01
Midwest	\$1.85	\$1.89
Gulf Coast	\$1.77	\$2.01
Rocky Mountain	\$1.71	\$1.96
West Coast	\$1.76	\$2.45
<b>NATIONAL AVERAGE</b>	<b>\$1.75</b>	<b>\$2.13</b>

TABLE 13d - LNG		
Average Retail Price by Refueling Station Type (\$/DGE)		
Region	Private	Public
New England	---	\$2.75
Central Atlantic	---	---
Lower Atlantic	---	\$2.26
Midwest	---	\$2.63
Gulf Coast	---	\$2.36
Rocky Mountain	\$2.63	\$2.54
West Coast	\$1.82	\$2.61
<b>NATIONAL AVERAGE</b>	<b>\$1.92</b>	<b>\$2.53</b>

--- indicates no data points were submitted for this region.



Comparison Of Prices By Region For Public & Private Refueling Stations cont.

TABLE 13e - E85 Average Retail Price by Refueling Station Type (\$/gal)		
Region	Private	Public
New England	---	\$2.55
Central Atlantic	\$2.37	\$2.28
Lower Atlantic	---	\$1.94
Midwest	\$2.16	\$1.82
Gulf Coast	\$1.84	\$1.84
Rocky Mountain	---	\$2.00
West Coast	\$2.60	\$2.39
<b>NATIONAL AVERAGE</b>	<b>\$2.26</b>	<b>\$1.98</b>

TABLE 13f - Propane Average Retail Price by Refueling Station Type (\$/gal)		
Region	Private	Public
New England	\$2.46	\$3.02
Central Atlantic	\$1.34	\$2.95
Lower Atlantic	\$3.72	\$2.87
Midwest	\$1.84	\$2.69
Gulf Coast	\$1.46	\$2.66
Rocky Mountain	\$1.69	\$2.82
West Coast	\$3.17	\$2.93
<b>NATIONAL AVERAGE</b>	<b>\$1.99</b>	<b>\$2.82</b>

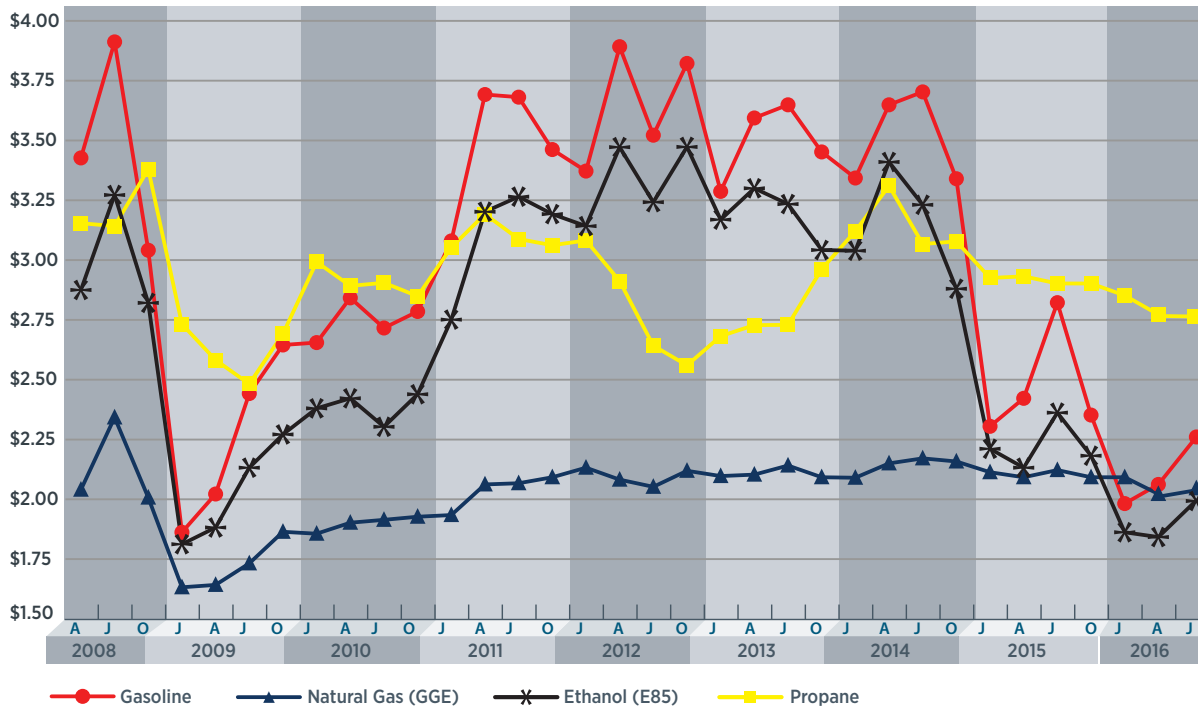
TABLE 13g - B20 Average Retail Price by Refueling Station Type (\$/gal)		
Region	Private	Public
New England	\$2.42	\$2.67
Central Atlantic	\$2.70	\$2.64
Lower Atlantic	\$1.89	\$2.24
Midwest	\$1.95	\$2.49
Gulf Coast	\$1.81	\$2.38
Rocky Mountain	---	\$2.43
West Coast	\$2.92	\$2.80
<b>NATIONAL AVERAGE</b>	<b>\$2.58</b>	<b>\$2.52</b>

TABLE 13h - B99/B100 Average Retail Price by Refueling Station Type (\$/gal)		
Region	Private	Public
New England	---	\$2.22
Central Atlantic	\$1.84	\$2.90
Lower Atlantic	\$3.95	\$2.70
Midwest	---	---
Gulf Coast	---	\$2.17
Rocky Mountain	---	---
West Coast	\$3.60	\$3.22
<b>NATIONAL AVERAGE</b>	<b>\$3.64</b>	<b>\$2.87</b>

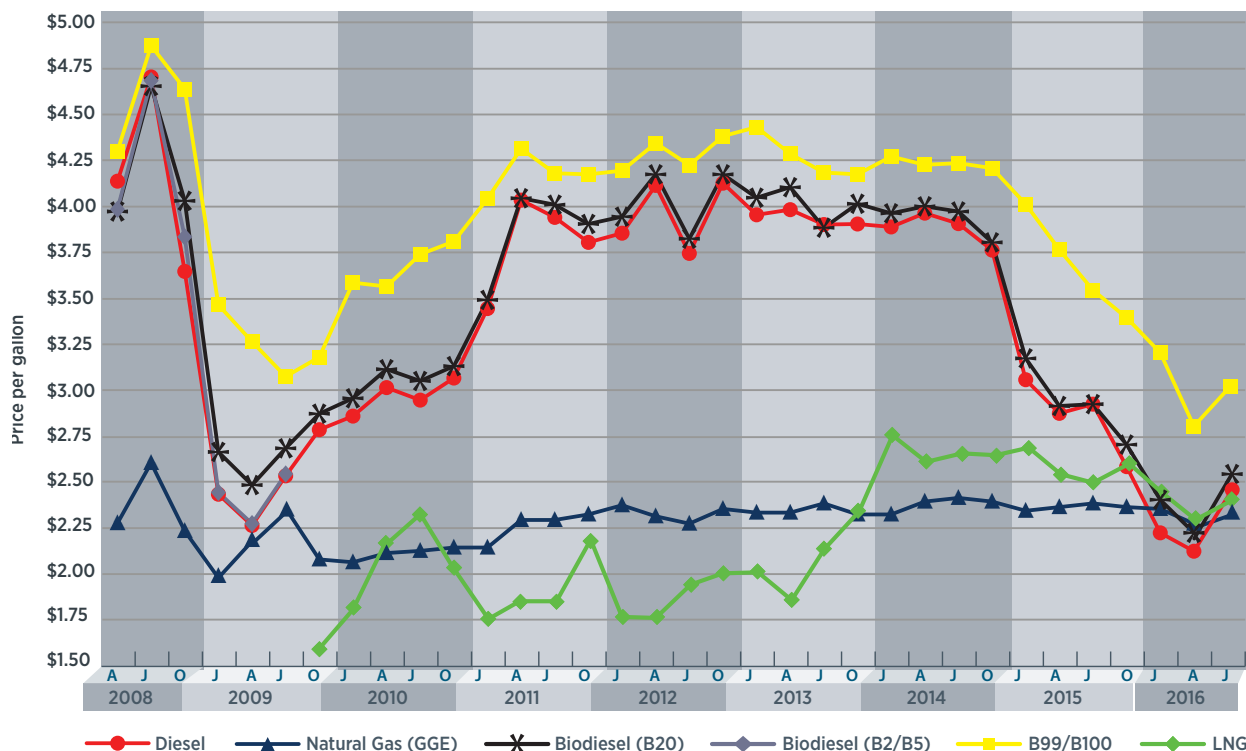
--- indicates no data points were submitted for this region.

## Historical Alternative Fuel Prices From Previous Reports

The following graphs illustrate historical prices for the alternative fuels included in the Alternative Fuel Price Report from 2008 to the present, relative to gasoline and diesel. Compressed natural gas (in GGE), propane, and ethanol (E85) have been graphed against gasoline prices, while compressed natural gas (in DGE) and biodiesel blends (B20 and B99/B100) have been graphed against diesel prices.



**FIGURE 16**  
ALTERNATIVE FUEL PRICES VERSUS GASOLINE



**FIGURE 17**  
ALTERNATIVE FUEL PRICES VERSUS DIESEL

## Illustration of Conversion Factors for Fuels

Fuel	Lower Heating Value
Gasoline (E0)	115,400 BTU/gal
Gasoline (E10) <sup>9</sup>	114,300 BTU/gal
Diesel	128,700 BTU/gal
Biodiesel (B100)	117,100 BTU/gal
Compressed Natural Gas (CNG) <sup>10</sup>	114,300 BTU/GGE
Ethanol (E100)	75,700 BTU/gal
Propane	83,500 BTU/gal

Conversion factors used to establish prices in dollars per gasoline gallon equivalent (\$/GGE) and dollars per diesel gallon equivalent (\$/DGE) were developed using the lower heating values from the Transportation Energy Data Book Edition 34, Table B.4,<sup>8</sup> and are listed to the left.

In the case of CNG, prices are provided to us in GGE, so no conversion is necessary. The representative heating value of CNG is provided in Table 13 as a reference.

### Conversion to GGE

The conversion factor used to convert the price of an alternative fuel from \$/gallon to \$/GGE is determined as follows:

$$\text{Conversion factor} = \frac{\text{BTU/gal of gasoline (E10)}}{\text{BTU/gal of alternative fuel}}$$

To calculate the price of an alternative fuel in \$/GGE, multiply the price per gallon of the alternative fuel by the relevant conversion factor from Table 14.

### Conversion to DGE

The conversion factor used to convert the price of an alternative fuel from \$/gallon to \$/DGE is determined as follows:

$$\text{Conversion factor} = \frac{\text{BTU/gal of diesel}}{\text{BTU/gal of alternative fuel}}$$

For example, the conversion factor used to convert a B100 price from \$/gal to \$/DGE is determined as follows:

$$\frac{128,700 \text{ BTU/gal of diesel}}{117,100 \text{ BTU/gal of B100}} = 1.099, \text{ rounded to } 1.10$$

To calculate the price of an alternative fuel in \$/DGE, multiply the price per gallon of the alternative fuel by the relevant conversion factor from Table 15.

For example, if the price of B100 is given as \$3.00/gal, the \$/DGE is determined as follows: (\$3.00/gal) x 1.10 = \$3.30/DGE

Fuel	Conversion Factor
Biodiesel (B20)	0.90
Biodiesel (B100)	0.98
CNG	1.00
Ethanol (E85) <sup>11</sup>	1.30
LNG	0.89
Propane	1.37

Fuel	Conversion Factor
Biodiesel (B20)	1.02
Biodiesel (B100)	1.10
CNG	1.13
Ethanol (E85) <sup>12</sup>	1.47
LNG <sup>13</sup>	1.00
Propane	1.54

<sup>8</sup> <http://cta.ornl.gov/data>

<sup>9</sup> According to the National Renewable Energy Laboratory (NREL) Alternative Fuels Data Center, the energy content of common gasoline baseline references (E0, E10 and indolene) varies between 112,114 and 116,090 Btu/gal. We chose 114,300 Btu/gal for the E10 energy content, consistent with the Transportation Energy Data Book (TEDB) energy content of CNG, in GGEs. See next footnote.

<sup>10</sup> (5.66 lbs. of CNG/GGE) x (20,200 BTU/lb.) = 114,332; rounded to 114,300.

<sup>11</sup> Most gasoline available throughout the United States today is a blend of 90% gasoline and up to 10% ethanol, or E10. Additionally, the E85 that is sold in the United States today actually contains, on average, approximately 70% ethanol. E85 energy content for this report is therefore calculated as [(0.70) x (E100 energy content)] + [(0.30) x (E0 energy content)], to more closely reflect the actual energy content of E85 fuel available today.

<sup>12</sup> See footnote 11, above.

<sup>13</sup> In July 2016, at its annual meeting, the National Conference of Weights and Measures (NCWM) voted to approve the diesel gallon equivalent (DGE) as an authorized method of measuring natural gas sold as a vehicle fuel. 1 DGE means 6.059 lbs. of liquefied natural gas (LNG) or 6.384 lbs. of compressed natural gas (CNG).

## Comparison of Prices on an Energy-Equivalent Basis

The following tables compare prices for E85, propane, B20 and B99/B100 to conventional fuels (gasoline and diesel) on an energy-equivalent basis. (Natural gas is generally sold in gasoline gallon equivalents or diesel gallon equivalents, so the natural gas “price at the pump” can be directly compared to the price of the corresponding conventional fuel, as shown in Tables 5, 6 and 7.)

TABLE 17a Ethanol (E85) And Gasoline Average Retail Prices by Region (GGE)			
Region	E85 Prices (\$/GGE)	Gasoline Prices (\$/gal)	Difference*
New England	\$3.31	\$2.38	\$0.94
Central Atlantic	\$2.98	\$2.27	\$0.71
Lower Atlantic	\$2.52	\$2.16	\$0.36
Midwest	\$2.39	\$2.13	\$0.26
Gulf Coast	\$2.39	\$2.01	\$0.38
Rocky Mountain	\$2.60	\$2.25	\$0.35
West Coast	\$3.12	\$2.73	\$0.39
<b>NATIONAL AVERAGE</b>	<b>\$2.59</b>	<b>\$2.26</b>	<b>\$0.33</b>

\*Negative numbers represent average E85 prices that are lower than gasoline, on a \$/GGE basis.

TABLE 17b Propane (LPG) and Gasoline Average Retail Prices by Region (GGE)			
Region	LPG Prices (\$/GGE)	Gasoline Prices (\$/gal)	Difference*
New England	\$4.08	\$2.38	\$1.70
Central Atlantic	\$3.56	\$2.27	\$1.29
Lower Atlantic	\$3.95	\$2.16	\$1.79
Midwest	\$3.56	\$2.13	\$1.43
Gulf Coast	\$3.53	\$2.01	\$1.52
Rocky Mountain	\$3.85	\$2.25	\$1.60
West Coast	\$4.04	\$2.73	\$1.31
<b>NATIONAL AVERAGE</b>	<b>\$3.78</b>	<b>\$2.26</b>	<b>\$1.52</b>

\*Negative numbers represent average propane prices that are lower than gasoline, on a \$/GGE basis.

TABLE 17c Biodiesel (B20) and Diesel Average Retail Prices by Region (DGE)			
Region	B20 Prices (\$/DGE)	Diesel Prices (\$/gal)	Difference*
New England	\$2.67	\$2.56	\$0.11
Central Atlantic	\$2.73	\$2.83	-\$0.10
Lower Atlantic	\$2.24	\$2.28	-\$0.04
Midwest	\$2.47	\$2.28	\$0.19
Gulf Coast	\$2.39	\$2.15	\$0.24
Rocky Mountain	\$2.48	\$2.31	\$0.17
West Coast	\$2.89	\$2.75	\$0.14
<b>NATIONAL AVERAGE</b>	<b>\$2.59</b>	<b>\$2.46</b>	<b>\$0.13</b>

\*Negative numbers represent average B20 prices that are lower than diesel, on a \$/DGE basis.

TABLE 17d Biodiesel (B99/100) and Diesel Average Retail Prices by Region (DGE)			
Region	B99/100 Prices (\$/DGE)	Diesel Prices (\$/gal)	Difference*
New England	\$2.44	\$2.56	-\$0.12
Central Atlantic	\$2.81	\$2.83	-\$0.03
Lower Atlantic	\$3.45	\$2.28	\$1.17
Midwest	---	\$2.28	---
Gulf Coast	\$2.39	\$2.15	\$0.24
Rocky Mountain	---	\$2.31	---
West Coast	\$3.59	\$2.75	\$1.31
<b>NATIONAL AVERAGE</b>	<b>\$3.33</b>	<b>\$2.46</b>	<b>\$0.87</b>

\*Negative numbers represent average B99/B100 prices that are lower than diesel, on a \$/DGE basis.

## Acknowledgements

The authors would like to acknowledge all of the contributors from the Clean Cities community who have provided prices for this report; we sincerely appreciate your continued dedication to the success of this report. The authors would also like to acknowledge the continued support of DOE for developing this report.

## Would You Like To Participate?

If you would like to provide prices for alternative fuels in your region and be part of the data collection effort for this report, or if you have any questions, please contact:

U.S. DOE, Clean Cities  
EE-3V  
1000 Independence Avenue, SW  
Washington, D.C. 20585  
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