## 2018 Propane Industry's Economic Impact Report

Impact of the U.S. Consumer Propane Industry on U.S. and State Economies in 2018

April 2020

Prepared for the Propane Education \& Research Council (PERC)

## Prepared for:

Propane Education \& Research Council
Suite 1075
1140 Connecticut Ave. NW
Washington, DC 20036

## Prepared by:

ICF
9300 Lee Highway
Fairfax, Virginia 22031
Tel. (703) 218-2758

## PRIMARY AUTHORS

This report documents the results of a study conducted for PERC by a team from ICF. The effort was coordinated by Michael Sloan, Managing Director of ICF's Gas, NGL, and Oil Advisory Consulting practice. The primary author for the report was Eric Kuhle. Questions regarding this report may be directed to:

Eric Kuhle, ICF (Eric.Kuhle@ICF.com)
Michael Sloan, ICF (Michael.Sloan@ICF.com)

## Table of Contents

1. Introduction and Summary ..... 1
1.1. Introduction ..... 1
1.2. Change from 2015 to 2018 ..... 2
2. Methodology and Scope of Analysis ..... 7
2.1. Impact from Production, Transportation and Consumption ..... 7
2.1.1 Production ..... 7
2.1.2 Midstream ..... 8
2.1.3 Downstream .....  8
2.1.4 Propane Retailer Capital Spending ..... 9
2.2. Direct Economic Impact from the Purchase and Manufacture of Propane Equipment, Engines, and Appliances ..... 9
3. Employment and Wages Results ..... 10
3.1. Employment and Wages in the Odorized Propane Industry ..... 10
3.1.1 Direct Employment from Production, Transportation, and Consumption ..... 10
3.1.2 Direct Wages ..... 12
3.1.3 Indirect and Induced Employment and Wages ..... 12
3.2. Manufacturing of Propane Equipment, Engines, and Appliances ..... 17
4. Direct Economic Impact Results. ..... 19
4.1. Economic Impact from Production, Transportation, and Consumption ..... 19
4.1.1 Upstream ..... 19
4.1.2 Midstream ..... 20
4.1.3 Downstream ..... 21
4.1.4 Retailer Spending ..... 22
4.2. Summary Results of the Propane Value Chain Analysis ..... 30
4.3. Economic Impact from the Manufacture of Propane Appliances and Engines ..... 47
4.3.1 Residential Sector Propane Equipment Usage ..... 47
4.3.2 Commercial Sector Propane Equipment Installations ..... 51
4.3.3 Propane Internal Combustion Engines ..... 52
4.3.4 Other Agricultural Products. ..... 57
4.3.5 Industrial Sector ..... 58
5. National Overview by State ..... 59
5.1. Residential Propane Accounts and Primary Heated Households by State ..... 60
5.2. Retail Propane Employment by State ..... 61
5.3. Retail Propane Wages (\$ Millions) by State ..... 62
5.4. Total Propane Employment by State ..... 63
5.5. Total Propane Wages (\$Millions) by State ..... 64
5.6. Total Employment from Natural Gas Liquids and Propane by State ..... 65
5.7. Total Wages (\$Millions) from Natural Gas Liquids and Propane by State ..... 66
5.8. Direct Added Value from Odorized (Retail) Propane by State ..... 67
5.9. Indirect and Induced Added Value (\$Millions) from Retail Propane by State ..... 68
5.10. Total Added Value (\$Millions) from Retail Propane by State. ..... 69
5.11. Total Added Value (\$Millions) from Propane by State ..... 70
A. Appendix: Odorized Propane Industry's Impact on the U.S. Economy by State ..... 71
B. Residential Sector, By State and Division ..... 126
C. Appendix: NAICS Codes and Definitions ..... 129
D. Appendix: Acronyms ..... 130
E. Appendix: Major Public Data Sources ..... 131
List of Figures
Figure 1. U.S. Residential Propane Price and Mont Belvieu Propane Prices ..... 2
Figure 2. Direct Value Added from Propane Value Chain Components ..... 4
Figure 3. Odorized Propane (Retail) Value Added by U.S. Census Region and Year ..... 5
Figure 4. U.S. Propane/Propylene Imports and Export as Share of Total Supply ..... 6
Figure 5. Manufacturing Employment Percentages by State ..... 17
Figure 6. Share of 2018 Retail Propane Sales by Company Type ..... 22
Figure 7. U.S. Propane Retailer Capital and O\&M Spending by State ..... 23
Figure 8: Value Chain for Odorized Propane $\left(\mathrm{C}_{3} \mathrm{H}_{8}\right), 2018$ (Million Dollars) ..... 32
Figure 9: Volume Chain for Odorized Propane $\left(\mathrm{C}_{3} \mathrm{H}_{8}\right), 2018$ (Thousand Gallons) ..... 33
Figure 10: Value Chain for All Purity Propane $\left(\mathrm{C}_{3} \mathrm{H}_{8}\right), 2018$ (Million Dollars) ..... 34
Figure 11: Volume Chain for All Purity Propane $\left(\mathrm{C}_{3} \mathrm{H}_{8}\right), 2018$ (Thousand Gallons) ..... 35
Figure 12: Value Chain for Butanes ( $\mathrm{C}_{4} \mathrm{H}_{10}$ ), 2018 (Million Dollars) ..... 36
Figure 13: Volume Chain for Butanes $\left(\mathrm{C}_{4} \mathrm{H}_{10}\right)$, 2018 (Thousand Gallons) ..... 37
Figure 14: Value Chain for Ethane $\left(\mathrm{C}_{2} \mathrm{H}_{6}\right), 2018$ (Million Dollars) ..... 38
Figure 15: Volume Chain for Ethane $\left(\mathrm{C}_{2} \mathrm{H}_{6}\right), 2018$ (Thousand Gallons) ..... 39
Figure 16: Value Chain for All NGLs and LRGs, 2018 (Million Dollars) ..... 40
Figure 17: Volume Chain for All NGLs and LRGs, 2018 (Thousand Gallons) ..... 41
Figure 18. Residential Odorized Propane Consumption by End-Use ..... 48
Figure 19. Residential Appliance Installations by Type and Construction Status ..... 48
Figure 20. Number of Households with New Propane Appliances by State ..... 50
Figure 21. Average Number of New Commercial Businesses that Use Propane by Industry Type (2003 to 2012) ..... 52
Figure 22. Number of Public Propane Fueling Stations by State ..... 53
Figure 23. Number of Propane Fueled School Buses and Share of Total School Bus Fleet by State ..... 55
Figure 24. New U.S. Forklift Shipments by Class ..... 56
Figure 25. Number of 2018 Propane Forklift Shipments by State ..... 56
Figure 26. Residential Propane Accounts and Primary Heated Households by State ..... 60
Figure 27. Retail Propane Employment by State (Section 3) ..... 61
Figure 28. Retail Propane Wages (\$ Millions) by State (Section 3) ..... 62
Figure 29. Total Propane Employment by State (Section 3) ..... 63
Figure 30. Total Propane Wages (\$Millions) by State (Section 3). ..... 64
Figure 31. Total Employment from Natural Gas Liquids and Propane by State (Section 3). ..... 65
Figure 32. Total Wages (\$Millions) from Natural Gas Liquids and Propane by State (Section 3) ..... 66
Figure 33. Direct Added Value from Odorized (Retail) Propane by State (Section 4) ..... 67
Figure 34. Indirect and Induced Added Value (\$millions) from Retail Propane by State (Section 4 ..... ) 68
Figure 35. Total Added Value (\$Millions) from Retail Propane by State (Section 4) ..... 69
Figure 36. Total Added Value (\$Millions) from Propane by State (Section 4) ..... 70
List of Tables
Table 1. Propane Production and Consumption ..... 3
Table 2: 2018 National Summary of Direct Employment and Wages Associated with Odorized Propane ..... 11
Table 3: Employment and Wages in Odorized Propane and Related Industries, 2018 ..... 13
Table 4: Odorized Propane $\left(\mathrm{C}_{3} \mathrm{H}_{8}\right)$ Employment and Wages Summary, 2018 ..... 14
Table 5: Propane $\left(\mathrm{C}_{3} \mathrm{H}_{8}\right)$ Employment and Wages Summary, 2018 ..... 15
Table 6: Total NGLs / LRGs Employment and Wages Summary, 2018 ..... 16
Table 7. Employment from Manufacturing Activities ..... 18
Table 8. 2018 National-Level Odorized Propane Consumption and Expenditures by Sector ..... 19
Table 9: State Value Added, Employment, and Wages for Odorized Propane, 2018 ..... 25
Table 10: State Production of Odorized Propane $\left(\mathrm{C}_{3} \mathrm{H}_{8}\right), 2018$ ..... 26
Table 11: State Level Value Summary for Odorized Propane ( $\mathrm{C}_{3} \mathrm{H}_{8}$ ), 2018 ..... 27
Table 12: State Level Value Summary for Propane ( $\mathrm{C}_{3} \mathrm{H}_{8}$ ), 2018 ..... 28
Table 13: State Level Value Summary for Total NGLs / LRGs, 2018 ..... 29
Table 14: National Value Summary for Odorized Propane $\left(\mathrm{C}_{3} \mathrm{H}_{8}\right), 2018$ ..... 42
Table 15: National Value Summary for All Purity Propane $\left(\mathrm{C}_{3} \mathrm{H}_{8}\right), 2018$ ..... 43
Table 16: National Value Summary for Butanes ( $\mathrm{C}_{4} \mathrm{H}_{10}$ ), 2018 ..... 44
Table 17: National Value Summary for Ethane ( $\mathrm{C}_{2} \mathrm{H}_{6}$ ), 2018 ..... 45
Table 18: National Value Summary for Total NGL and LRG, 2018 ..... 46
Table 19. Economic Impact from Manufacturing Activities (\$Millions) ..... 47
Table 20: 2018 Residential Households Primary Space Heating Fuels by Division ..... 126
Table 21: 2018 Residential Households Primary Space Heating Fuels (1) ..... 127
Table 22: 2018 Residential Households Primary Space Heating Fuels (2) ..... 128
Table 23. NAICS Codes and Definitions ..... 129

## 1. Introduction and Summary

### 1.1. Introduction

Propane is third most widely used fuel in the U.S. by the number of households, second to electricity and natural gas. All told, propane is used in roughly 50 million American homes, with 11.9 million households using propane for either space or water heating, 5.8 million of which depend on propane as their primary space heating fuel. ${ }^{1}$ In addition, over 42 million homes use propane for outdoor grilling activities. ${ }^{2}$

In addition to the significant role propane plays in the residential sector, the propane industry directly serves 1.1 million commercial accounts, 184,700 industrial accounts, and 504,700 agricultural accounts. ${ }^{3}$ Propane also continues to be the most common internal combustion fuel for forklifts and has rapidly become the third most common fuel for school buses behind gasoline and diesel fuels.

Transportation demand accounts for 9 percent of global propane consumption, ${ }^{4}$ while in the U.S. internal combustion demand accounts for 10 percent of domestic retail consumption. The prevalence of propane demand in the transportation sector highlights the mass appeal of this clean burning and cheap alternative to traditional transportation fuels like gasoline and diesel. Propane is the third most widely used transportation fuel globally and ICF estimates that in the U.S. nearly 155,000 vehicles used propane as fuel in 2018. ${ }^{5}$

In recognition of the important role propane plays in the U.S. energy marketplace, the Propane Education and Research Council (PERC) has commissioned ICF to perform what is now the fifth analysis of the impact of the odorized propane industry on the national and state economies. Previous iterations of the report were released in 2004 (reporting estimates for 2002), in 2011 (reporting estimates for 2009), in 2014 (reporting estimates for 2012), and in 2017 (reporting estimates for 2015). ${ }^{6,}$ As with past releases, the focus of this report is to estimate the aggregate GDP impacts due to propane industry activity, as well as the contribution of the odorized propane industry to employment and wages both on the national level and from a state-by-state perspective. This iteration of the study also includes a supplemental assessment of capital spending for the retail propane sector and purchases of propane appliances by consumers.

[^0]
### 1.2. Change from 2015 to 2018

The ICF/reported odorized propane sales increased 13.6 percent between 2015 and 2018, from 8.3 billion gallons to 9.3 billion gallons. The majority of the increase can be attributed to increases in residential and commercial consumption, primarily driven by colder weather, with some growth in the number of propane heated households. The number of propane heated households increased by $4 \%$ during this period, from 5.57 million in 2015 to 5.79 million in 2018. Demand in other sectors increased by 73 million gallons.

Relative to 2015, the odorized propane industry's direct economic impact increased, from \$40.5 billion in 2015 to $\$ 46.4$ billion in 2018 - a 14.7 percent increase in nominal terms. Total employee count attributed to the odorized propane industry increased 5.8 percent, while growth in consumption and propane prices supported increased sales for the retail propane sector.

The increases were primarily attributable to growth in the domestic component of the odorized propane market, a sector whose value increased from $\$ 45.4$ billion in 2015 to $\$ 54.6$ billion in 2018. These gains were supported by a 13.4 percent increase in domestic propane/propylene production and a 13.6 percent increase in retail consumption, from 8.32 billion gallons in 2015 to 9.3 billion gallons in 2018.

From 2015 to 2018, Mont Belvieu propane prices increased by 92 percent, from 45.70 \$/gallon in 2015 to 87.80 な/gallon in 2018, due to both increased crude oil prices and a higher relative propane price to global oil prices. This increased price in wholesale propane supplies was not directly passed on to consumers, however, the average national residential price for propane increased 16 percent, increasing by $35 \$ /$ gallon to average $249 \Phi /$ gallon in 2018.

Figure 1. U.S. Residential Propane Price and Mont Belvieu Propane Prices


Source: EIA
Improvements in energy efficiency and fuel switching technologies continue to impact the propane market, resulting in an increase in the average fuel efficiency for in-home appliances. However, weather remains the dominant factor influencing annual per-household consumption and accounts
for the majority of the 911 million gallon increase in residential and commercial propane consumption between 2015 and 2018.

Agricultural demand experienced an increase of 10.5 percent from 2017 to 2018, to reach a total of 965.9 million gallons in 2018. This estimate is well above the 2015 agricultural demand levels of 866 million gallons. ${ }^{7}$ Wet weather and spring flooding delayed crop plantings in 2018 and resulted in larger than normal agricultural demand in the Midwestern U.S., while new propane applications and irrigation engines also accounted for year-on-year growth from the sector. Compared to 2015, which was one of the warmest years on record for the continental U.S., temperatures in 2018 were somewhat closer to the 20-year average. Temperatures in 2018 were 0.7 percent colder than the 20-year average, while in 2015 they were 5.8 percent warmer. ${ }^{8}$

Table 1. Propane Production and Consumption

| Million Gallons | $\mathbf{2 0 0 9}$ | $\mathbf{2 0 1 2}$ | $\mathbf{2 0 1 5}$ | $\mathbf{2 0 1 8}$ | Change from <br> 2015 to 2018 |
| :--- | :---: | :---: | :---: | :---: | :---: |
| Domestic Propane/Propylene Production | $\mathbf{1 6 , 6 0 7}$ | 19,447 | 26,111 | $\mathbf{3 0 , 5 8 5}$ | $17.1 \%$ |
| Propane Imports | 2,254 | 1,783 | 1,896 | 2,403 | $26.8 \%$ |
| Propane Exports | 1,299 | 2,625 | 9,426 | 14,553 | $54.4 \%$ |
| Propane Consumption | 9,600 | 7,739 | 8,451 | 9,600 | $10.4 \%$ |
| Residential | 5,565 | 4,074 | 4,579 | 5,565 | $13.2 \%$ |
| Commercial | 1,499 | 1,482 | 1,619 | 1,499 | $18.9 \%$ |
| Industrial | 501 | 508 | 469 | 501 | $-12.2 \%$ |
| Agricultural | 1,188 | 809 | 866 | 1,188 | $37.2 \%$ |
| Internal Combustion | 484 | 615 | 623 | 484 | $-21.3 \%$ |
| Cylinder Markets (Resell) | 361 | 251 | 284 | 361 | $25.0 \%$ |
| Heating Degree Days (Annual) | 4,488 | 3,792 | 4,111 | 4,333 | $5.4 \%$ |
| Mont Belvieu Propane Price | 84.06 | 100.15 | 45.70 | 87.80 | $92.1 \%$ |
| (\$/gallon) |  |  |  |  |  |

Source: ICF, EIA, API, ICF, Bloomberg, NOAA
Since 2015, the majority of the added value generated by the propane industry to the national economy has shifted further downstream, with the retail sector increasing the direct value added from $\$ 9.6$ billion in 2015 to $\$ 11.3$ billion in 2018. The wholesale sector also experienced an increase in the direct value added to the national economy, though one that was proportionally smaller, with its increase from $\$ 1.6$ billion direct value added in 2015 to $\$ 1.9$ billion in 2018. Propane supply remained the largest contributor of direct value by the propane sector, accounting for 51 percent of the sector's direct added value in 2018, similar to 2015 levels. In 2018, the added economic value attributed to the retail propane industry was concentrated in the downstream - or retail - sector, where 42 percent of all direct value was created.

[^1]Figure 2. Direct Value Added from Propane Value Chain Components


Source: ICF Propane Value Study (2015 and 2018)
The shift in value generation was also geographic in nature, with increases in the value added from retail propane increasing most dramatically in the Northeast and Midwest, while the Rocky Mountain and Gulf Coast states have experienced declines. Texas, where a large portion of the U.S. fractionation capacity and gas processing capacity are located, captured 15 percent of total domestic value added from Propane in 2015. In 2018 however, the state declined to account for only 12 percent of the domestic value added due to a shift of value-added contributions to the retail sector and domestic consumption, which is more heavily located in Midwest and Northeast states. However, even in 2018 Texas remained the state with the highest contribution to GDP of any state, with $\$ 6.7$ billion of added value, followed by Michigan with $\$ 3$ billion and Minnesota with $\$ 2.5$ billion.

Relative to 2015, domestic propane production has increased sharply. However, due to a reduction in wholesale propane prices, total producer value has nevertheless declined. As a result, retail sales now account for a larger percentage of the value-added activities than do those associated with production.

With the return of normal winter conditions in 2018 compared to 2015, the Midwestern states experienced large increases in total retail propane consumption and economic added value. In particular, the East North Central saw the added economic value from propane increase 50 percent between 2015 and 2018, a region that experienced one of the largest changes in propane consumption. The South Atlantic and New England census regions both experienced moderate gains of 6.9 percent and 8.2 percent from 2015 to 2018, respectively.

Figure 3. Odorized Propane (Retail) Value Added by U.S. Census Region and Year


Source: ICF Propane Value Study (2015 and 2018)
The domestic contribution to the odorized propane industry continues to grow.

- Value added generated in the U.S. from U.S. resources increased from 93 percent in 2015 to 95 percent in 2018. Including Canada, value added in the odorized propane industry attributable to North American labor and resources remained largely flat at 98 percent in 2018.
- Share of volumes of odorized propane consumed in the U.S. produced from U.S. resources increased from 82 percent in 2015 to 85 percent in 2018. When imports of Canadian purity propane and refining and gas plant feedstock are included, North American contribution to volumes increased from 94 percent in 2015 to 95 percent in 2018, with the remaining propane volume derived from imported crude oil.

Propane production in the U.S. has increased markedly with the increases in shale gas and associated gas production from U.S. tight oil plays. As the production of domestically produced natural gas and oil increases, so too will the domestic value-added contribution by the odorized propane industry to the U.S. economy. U.S. propane production from gas processing plants grew by 22 percent from 2015 to 2018 and totaled 21.5 billion gallons in 2018.

Following the rise in domestically produced propane, exports have increased to become the largest source of demand. In 2018, over 14.5 billion gallons of propane were exported. Propane exports are expected to continue to increase both in volume and in the share of domestic production that they support. In 2016, propane exports exceeded the amount of domestic consumption of propane in the retail sector and now is nearly $150 \%$ of domestic retail sales volumes.

Impact of the U.S. Consumer Propane Industry on U.S. and State Economies in 2018

Figure 4. U.S. Propane/Propylene Imports and Export as Share of Total Supply


Source: EIA, ICF

## 2. Methodology and Scope of Analysis

### 2.1. Impact from Production, Transportation and Consumption

To perform a detailed value-chain analysis for odorized propane at the state level ICF took a twostep approach: one, to identify all points along the pathway from the wellhead to the burner tip where value is added; and two, to allocate these values to individual states.

The primary source of propane production and inventory data is the Energy Information Administration (EIA). Because data reported by the EIA is primarily available only at the PADD ${ }^{9}$ level, or in some cases at the refining district level ${ }^{10}$, the data reported by the EIA was allocated to the state level by ICF. For this task, ICF employed a number of sources, both proprietary and public.

Furthermore, the comingling of various natural gas liquids (NGLs) at several levels of production and transport, as well as the lack of data on the individual components of the NGL-mix, resulted in the need to perform a full sector analysis that evaluated the volume and value chains of all NGL purity products. Through this process ICF was able to arrive at detailed estimates of both the share of total gallons and the share of value attributable to odorized propane. As a result, this study includes value tables for the total NGL complex, as well as the subsets of all propane, odorized propane, butanes, and ethane. By evaluating the full value chain for all liquids and the propane component in particular, the analysis resulted in estimates of the economic impact of odorized propane at the three stages of the supply chain: production, wholesale transport and storage, and retail. That impact, measured in terms of employment, wages, and gross domestic product (GDP) is then allocated at the state level.

### 2.1.1 Production

This study is focused solely on natural gas liquids purity products. ${ }^{11}$ This approach, a result of ICF's in-house analysis and the employment of newly-available data sources, allows for a more accurate representation of the impact of the natural gas liquids industry on the U.S. economy. The result is a study that is both more useful to the propane industry and better able to report the value and volume chains of the butanes component of the NGL mix. Leveraging more accurate and complete data sources also allows for a more accurate tracking of product imports into the country, in terms of both quantities of products and ports of entry.

[^2]The analysis of propane production includes volumes produced from natural gas feedstocks - via gas processing plants and fractionators- as well as those produced as byproducts of the crude oil refining process. ICF calculations represent the volumes and values of natural gas liquids in the gas processing sector at a more detailed level than in previous studies, primarily by better applying data from both the EIA and internal sources on the raw gas quality produced in the various regions of the country. This approach more accurately credits natural gas liquids (NGLs) entrained in raw gas to those states where production takes place. A similar approach has also been employed to Liquefied Refinery Gases (LRGs) produced in refineries out of domestic and imported crudes. Crudes of varying qualities are credited with different shares of liquids yields, both by U.S. state, and for imported crudes. This data was not available in prior years, and its inclusion again provides for a more accurate assessment of where propane volumes and values are generated at the state level.

### 2.1.2 Midstream

ICF estimates for Midstream contribution to the value added generated by natural gas liquids include all activity in the transportation, storage, and wholesale stage of the value chain. These estimates are based on reported transportation costs of purity and mixed NGLs, reported volumes of product moved on all modes of transportation, and estimates of transport required within states in both upstream production activities and downstream retail activities. These costs are then allocated to the various purities, to propane specifically, and in the end to the odorized propane component of the market. Values allocated to the states include:

- All inter- and intra-state pipeline, surface, and water-borne transport of natural gas liquids. Both gathering lines that carry liquids entrained in raw natural gas and pipelines that move unfractionated raw NGLs are included. Special accounting is also made of liquids moved in dense phase along with natural gas along the Alliance pipeline.
- All activities associated with the shipment of purity propane from production regions to wholesale markets, such as Mont Belvieu and Conway, and on to the consumption centers.
- Accounting is also made of value added by wholesale activities. Value is also allocated to the market balancing services provided by storage operators.


### 2.1.3 Downstream

The retail sector is the largest source of employment directly attributable to the odorized propane industry. It also generates 64 percent of all value added for the retail propane sector and 42 percent for the entire propane sector.

LPG dealers are responsible for 98 percent of all value at the retail level, with gasoline stations contributing the remainder, due to their propane sale volumes. Total GDP impact of the retail sector is calculated as the difference between the value of propane at wholesale that is attributed to the odorized propane industry and the value of that same propane at the point of delivery to the customer.

The total contribution of the retail industry is then allocated to the states depending on a) that state's share of total gallons sold, and b) the total gallons of propane sold at the consumer level through gasoline stations (this includes gallons attributed to the motor vehicle market as well as propane cylinder sales done through gasoline stations).

### 2.1.4 Propane Retailer Capital Spending

The roughly 4,000 domestic propane retailers are made up of primarily small, private companies that operate from between one and three locations. There are also a number of cooperatives and larger private regional operators as well as several large national retailers. It is beyond the scope of this study to fully evaluate the capital and operating and maintenance spending of the retail propane sector by component and state. Instead, the study assessed the economic and employment impacts of the direct spending through the impacts of the Downstream Sector of the retail propane value chain analysis.

This approach has been taken to ensure that the economic impact of the retail propane sector is properly captured, given lack of transparency of the propane retailers, and to ensure that the impacts are not counted twice. ICF has prepared an estimate of the capital and O\&M spending by propane retailer for 2018. However, these spending estimates are not included in the analysis of the economic and employment impacts of the sector.

### 2.2. Direct Economic Impact from the Purchase and Manufacture of Propane Equipment, Engines, and Appliances

This study uses a very detailed bottom-up estimate of the capital spending in 2018 by retail propane consumers for equipment, engines, and appliances that use odorized propane. This spending is separate from the spending on the purchase of fuel sector's capital spending across the various components of the industry. This approach has been taken in such a detailed manner to ensure that the true economic impact of the retail propane sector is properly captured given the non-traditional sources of capital spending and lack of transparency of the propane retailers.

The purchase of propane appliances and engines is primarily undertaken in a non-transparent manner, either through direct appliance purchases by consumers or spending by propane retailers, which are unregulated and largely private enterprises. Due to the relatively small share of company operations that propane engines and appliances account for, most companies do not provide a readily transparent accounting of the numbers built and sold each year. Furthermore, the reporting of commercial manufacturing activity for the U.S. Census' Annual Survey of Manufactures does not distinguish between the primary fuel types for most appliances and engines.

## 3. Employment and Wages Results

### 3.1. Employment and Wages in the Odorized Propane Industry

### 3.1.1 Direct Employment from Production, Transportation, and Consumption

This study assesses the level of employment in the propane industry by state for 2018. While no single, comprehensive classification under the North American Industrial Classification System (NAICS) captures all employment and wage data associated with the natural gas liquids industry or especially with the retail propane industry in particular - ICF has identified those industrial segments where the employees working in the propane industry would be classified, including in the production, transportation, and distribution of propane, and has allocated employment in these industries accordingly, based on the contribution of the propane industry within each segment. Current analysis of total employment and wages attributable to the retail propane industry includes data obtained from the Bureau of Labor Statistics (BLS), the main source for labor-related data in this report. As of the writing of this report, the most recent year for which a full set of employment and wages data was available is 2018.

The BLS's Quarterly Census of Employment and Wages (QCEW) served as the primary source of labor and wage statistics for all Propane Industry Economic Impacts studies performed by ICF, including the 2009, 2012, and 2015 reports, as well as the current report based on 2018 data. The Bureau of Labor Statistics defines the census as "a comprehensive tabulation of employment and wage information for workers covered by state unemployment insurance (UI) laws and federal workers covered by the Unemployment Compensation for Federal Employees (UCFE) program." This definition in effect covers 98 percent of the U.S. legal labor force outside of the agricultural sector. The QCEW therefore serves as the primary data source for employment statistics across the U.S. economy, with statistics reported down to the county and metropolitan area level on a quarterly and annual basis, with monthly estimates.

Due to a number of data gathering and release restrictions, including the withholding of values to protect the anonymity of large employers, employment and wages data may not be available for all geographies in all periods. ICF addressed these data disclosure restrictions by estimating state level data based on the national totals, which are given for all categories in the data series, and other data that is available at the state level.

In the second quarter of 2011 the NAICS codes for Heating Oil Dealers and LPG Dealers were merged, and all economic statistics for these two classifications are now summed and reported under the Fuel Dealers classification. ICF accounted for this data reporting issue by attributing employment and wages to each category based on a combination of state-level historical trends, including total gallon sales, customer numbers, and sales per account for both propane and Fuel Oil usage. ICF also considered other reported propane employment reports, including the LP Gas Top 50 , and macro-level economic drivers in its determination of state-level wage and employment data.

For the 2018 report, ICF also included a total of 11 different employment and wage industry classifications. A full listing and description of these 11 NAICS categories can be found in Appendix A. For the purposes of this study, the three stages of the value chain and their associated NAICS categories are identified as follows:

- Production: Oil and Gas Extraction (NAICS Code 211111), NGL Extraction (211112), Drilling Oil and Gas Wells (213111), Support Activities for O\&G Operations (213112), and Petroleum Refining (32411)
- Transportation: Crude Pipelines (4861), Refined Petroleum Product Pipelines (48691), Natural Gas Pipelines (4862), and Wholesale Petroleum Trade (4247)
- Retail (Distribution): Gasoline Stations (447), Fuel Dealers (45431), and LPG Dealers (454312)

In order to disaggregate employment in the odorized propane industry from the broader categories reported in the QCEW data, ICF quantified the share of value component attributed to each output along the production chain, estimating the share of employees and wages coming from: 1) the total NGLs industry; 2) propane industry as a whole; and lastly 3) the odorized propane industry.
Total wages for the 11 classifications in 2018 were nearly $\$ 105$ billion, $\$ 1.07$ billion higher than the wages in 2015. Growth in wages was again concentrated primarily in the upstream and midstream segments of the overall industry (See Table 2). Of the total wages for these industries, production accounts for two thirds, followed by 23 percent from the retail sector and 15 percent in the transportation sectors. Wages attributed to the odorized (retail) propane sector, the retail component accounts for the majority of wages with a total of 66 percent, followed by the production sector with 30 percent and 4 percent in the transportation sector. From 2015 to 2018, wages attributable to the odorized (retail) propane sector increased by 29 percent to $\$ 4.2$ billion.

Table 2 below summarizes the employment and wages directly associated with the odorized propane industry at every step in the value chain. For state-by-state details, see Table 3 through Table 5.

Table 2: 2018 National Summary of Direct Employment and Wages Associated with Odorized Propane


Accounting for odorized propane industry's contribution to total value, an estimated total of 57,110 full time employment positions are directly attributable to the production, transportation, and distribution of odorized propane, accounting for 3.3 percent of all employees in the eleven industrial categories. The majority of these jobs ( 77 percent) are on the retail, or distribution, side of the industry.

### 3.1.2 Direct Wages

For this study, data on wages by NAICS category was also sourced from the Bureau of Labor Statistics' Quarterly Census of Employment and Wages. ICF estimated the total 2018 wages per sector attributable to NGLs, purity propane, and odorized propane using the same total-value-to-odorized-propane-value ratios used to allocate employment. The share of employment attributable to the product categories was estimated individually for each of the eleven NAICS codes included in the study. These estimates are found in Table 3 below. Summary totals for each product by industry segment are shown in Table 2 above. More detailed estimates of national-level wages by NAICS code are shown in the rightmost columns of Table 3, while state-level data for total Production, Transportation, and Retail can be found in Table 4 through Table 6.

As shown in Table 3 on the following page, direct wages generated by the odorized propane industry totaled $\$ 2.7$ billion in 2018, representing 2.2 percent of all wages generated by the eleven employment categories included in the odorized propane value chain, and employees 2.1 percent of the total employment for the eleven categories. This close relationship between odorized propane industry's share of total labor and total wages reflects the impact the industry has along the full value chain. Within the sector, however, there are wide disparities in wages per employee, with annual income in the supply segment on average double the wages in the retail segment.

Relative to 2015, per-employee average wages in the propane industry increased 0.8 percent in nominal terms, from $\$ 59,600$ in 2015 to $\$ 60,055$ in 2018. The average per-employee wage in the retail segment of the odorized propane sector increased to $\$ 46,573$ per year, which was well above the growth in wages reported for all labor categories covered by the Bureau of Labor Statistics' QCEW, which reported average U.S. worker wages have continued to increase in nominal terms from $\$ 49,300 / \mathrm{yr}$ in 2012 , to $\$ 52,900 / \mathrm{yr}$ in 2015 , and $\$ 62,800$ - an increase of 7.3 percent and 18.7 percent over two separate three year periods, more than doubling the cumulative inflation during the same period. ${ }^{12}$ The fastest wage growth was observed in the upstream segment of the propane value chain, as the tightening labor market in oil and gas drilling caused wage escalation well above the national trend.

### 3.1.3 Indirect and Induced Employment and Wages

The odorized propane industry has an impact on the economy beyond the direct employment and wages it generates. As companies in the production, transportation, and distribution segments of the value chain employ services that supply their operations (indirect economic impacts), or as the workers directly employed in the odorized propane industry spend their income and create demand for goods and services (induced economic impacts), the benefits of their spending lead to further employment throughout the U.S. economy.

ICF estimates that for 2018, in addition to the 57,110 jobs directly created by the odorized propane industry, another 39,977 indirect and induced full time jobs can be attributed to the industry, with indirect and induced wages adding another $\$ 5.2$ billion to the total wages that can be attributed to the odorized propane industry in addition to the $\$ 4.2$ billion from direct wages.

[^3]Table 3: Employment and Wages in Odorized Propane and Related Industries, 2018

|  |  | 2018 Total Employees |  |  | Total Wages ( 51.000 ) |  |  |  |  |  | Average Weekly Wages |  |  | 2018 Employee Counts Allocated to: |  |  |  | 2018 Wages (51,000) Allocated to: |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Description | Nalcs Code | Private | Govermment | Total |  | Private |  | mment |  | Total | Private | Govermment | Total | All NCLs | $\begin{aligned} & \hline \text { Propane/Propyl } \\ & \text { ene } \end{aligned}$ | Consumer-Grade Propane $\left(\mathrm{C}_{3} \mathrm{H}_{8}\right)$ | Odorized Propane | All NGLs | Consumer-Grade Propane $\left(\mathrm{C}_{3} \mathrm{H}_{8}\right)$ | Odorized Propane |
| Oil and Gas Extraction | 211111 | 142,364 | - | 184,796 | \$ | 30,152,579 | \$ | - | \$ | 30,152,579 | \$3,138 | - | \$3,138 | 21,794 | 9,445 | 8,034 | 2,846 | 3,556,138 | 1,310,930 | 464,391 |
| NGL Extraction | 211112 | 7,250 | - | 7,741 | \$ | 1,025,668 | \$ | - | \$ | 1,025,668 | \$2,548 | - | \$2,548 | 3,051 | 1,322 | 1,322 | 468 | 404,265 | 175,203 | 62,065 |
| Drilling Oil \& Gas <br> Wells | 213111 | 64,322 | - | 64,322 | \$ | 5,705,968 | s | - | \$ | 5,705,968 | \$1,706 | - | \$1,706 | 7,586 | 3,269 | 2,825 | 940 | 672,951 | 250,638 | 83,362 |
| Support Activities for O\&G Operations | 213112 | 264,786 | - | 264,786 | \$ | 19,261,036 | \$ | - | \$ | 19,261,036 | \$1,399 | - | \$1,399 | 44,468 | 21,384 | 19,553 | 6,798 | 3,234,662 | 1,422,308 | 544,173 |
| Petroleum Refineries | 32411 | 69,798 | - | 69,798 | \$ | 9,570,301 | \$ | - | \$ | 9,570,301 | \$2,637 | - | \$2,637 | 770 | 702 | 367 | 122 | 105,633 | 50,356 | 16,748 |
| Asphalt, Paving \& Roofing Manf. | 32412 | 26,567 | - | 26,567 | \$ | - | \$ | - | \$ | - | S0 | - | \$0 | - | - | - | - | - | - | - |
| Crude Pipelines | 4861 | 11,930 | - | 11,930 | \$ | 1,519,266 | \$ | - | \$ | 1,519,266 | \$2,449 | - | \$2,449 | 132 | 120 | 63 | 21 | 16,769 | 7,994 | 2,659 |
| Refined Petroleum Product Pipelines | 48691 | 7,563 | - | 7,563 | \$ | 953,010 | \$ | - | \$ | 953,010 | \$2,423 | - | \$2,423 | 801 | 254 | 220 | 73 | 100,874 | 27,710 | 9,216 |
| Natural Gas Pipelines | 4862 | 29,463 | 833 | 30,296 | \$ | 3,857,272 | \$ | 53,684 | \$ | 3,910,956 | \$2,518 | \$1,239 | \$2,483 | 816 | 352 | 352 | 117 | 105,374 | 45,405 | 15,102 |
| Wholesale Petroleum Trade | 4247 | 102,836 | 43 | 102,879 | \$ | 8,933,612 | \$ | - | \$ | 8,933,612 | \$1,671 | so | \$1,670 | 20,365 | 6,448 | 5,573 | 1,861 | 1,896,407 | 520,933 | 173,262 |
| Gasoline Stations | 447 | 932,389 | 2,057 | 934,446 | \$ | 20,970,682 | \$ | 52,196 | \$ | 21,022,878 | \$433 ${ }^{\prime \prime}$ | \$488 | \$433 | 3,796 | 3,796 | 3,796 | 3,796 | 85,406 | 85,406 | 85,406 |
| Heating Oil Dealers | 454311 | 73,091 | - | 73,091 | \$ | 4,067,486 | \$ | - | \$ | 4,067,486 | \$1,070 ${ }^{\prime \prime}$ | - | \$1,070 | - | - | - | - | - | - | - |
| LPG Dealers | 454312 | 40,068 | - | 40,068 | \$ | 2,690,613 | \$ | - | \$ | 2,690,613 | \$1,291 ${ }^{\prime \prime}$ | - | \$1,291 | 40,068 | 40,068 | 40,068 | 40,068 | 2,690,613 | 2,690,613 | 2,690,613 |
| Natural Gas Distributors | 2212 | 109,607 | - | 109,607 | \$ | 12,292,565 | \$ | - | \$ | 12,292,565 | \$2,157 | - | \$2,157 | - | - | - | - | - | - | - |
| $\overline{\text { Total }}$ |  | 1,882,034 | 2,933 | 1,927,890 |  | 121,000,058 |  | 105,880 |  | 121,105,938 | 1,236 | 694 | 1,208 | 143,647 | 87,161 | 82,173 | 57,110 | 12,869,091 | 6,587,496 | 4,146,996 |

Impact of the U.S. Consumer Propane Industry on U.S. and State Economies in 2018

Table 4: Odorized Propane $\left(\mathrm{C}_{3} \mathrm{H}_{8}\right)$ Employment and Wages Summary, 2018

|  |
| :--- |
|  |
| State |
| Alabama |
| Alaska |
| Arizona |
| Arkansas |
| California |
| Colorado |
| Connecticut |
| Delaware |
| District of Columbia |
| Florida |
| Georgia |
| Hawaii |
| Idaho |
| Illinois |
| Indiana |
| lowa |
| Kansas |
| Kentucky |
| Louisiana |
| Maine |
| Maryland |
| Massachusetts |
| Michigan |
| Minnesota |
| Mississippi |
| Missouri |
| Montana |
| Nebraska |
| Nevada |
| New Hampshire |
| New Jersey |
| New Mexico |
| New York |
| North Carolina |
| North Dakota |
| Ohio |
| Oklahoma |
| Oregon |
| Pennsylvania |
| Rhode Island |
| South Carolina |
| South Dakota |
| Tennessee |
| Texas |
| Utah |
| Vermont |
| Virginia |
| Washington |
| West Virginia |
| Wisconsin |
| Wyoming |
| Ws Total |

US Total

| Production |  |
| :---: | :---: |
| Employee Count | Wages (Thousand \$) |
| 40 | 4,466 |
| 273 | 30,537 |
| 0 | 2 |
| 8 | 884 |
| 267 | 30,035 |
| 793 | 89,037 |
| 0 | 0 |
| 1 | 201 |
| 0 | 0 |
| 3 | 360 |
| 0 | 0 |
| 1 | 83 |
| 1 | 59 |
| 52 | 5,984 |
| 5 | 675 |
| 0 | 0 |
| 129 | 14,506 |
| 19 | 2,148 |
| 311 | 35,793 |
| 0 | 0 |
| 0 | 0 |
| 0 | 0 |
| 12 | 1,403 |
| 2 | 295 |
| 69 | 7,852 |
| 0 | 14 |
| 35 | 3,963 |
| 3 | 328 |
| 0 | 43 |
| 0 | 0 |
| 3 | 468 |
| 730 | 81,730 |
| 0 | 35 |
| 0 | 0 |
| 1,035 | 115,799 |
| 193 | 21,813 |
| 1,154 | 129,497 |
| 0 | 0 |
| 176 | 19,913 |
| 0 | 0 |
| 0 | 0 |
| 2 | 203 |
| 2 | 273 |
| 5,106 | 573,255 |
| 99 | 11,140 |
| 0 | 0 |
| 0 | 1 |
| 3 | 410 |
| 520 | 58,593 |
| 0 | 3 |
| 127 | 14,148 |
| 11,174 | 1,255,950 |


| Trans., Stor., Wholesaling |  |
| :---: | :---: |
| Employee | Wages |
| Count | (Thousand \$) |
| 12 | 1,030 |
| 5 | 485 |
| 11 | 2,258 |
| 10 | 783 |
| 54 | 4,359 |
| 103 | 8,913 |
| 11 | 875 |
| 6 | 475 |
| 0 | 26 |
| 18 | 1,421 |
| 37 | 2,983 |
| 4 | 311 |
| 6 | 440 |
| 58 | 4,784 |
| 58 | 4,744 |
| -2 | -188 |
| 137 | 11,284 |
| 12 | 972 |
| 54 | 4,663 |
| 14 | 1,081 |
| 10 | 808 |
| 11 | 909 |
| 51 | 4,094 |
| 47 | 3,723 |
| 17 | 1,403 |
| 43 | 3,456 |
| 10 | 790 |
| 108 | 8,852 |
| 4 | 314 |
| 15 | 1,213 |
| 10 | 826 |
| 37 | 3,393 |
| 34 | 2,729 |
| 50 | 4,033 |
| 49 | 4,417 |
| 138 | 11,417 |
| 196 | 16,846 |
| 8 | 603 |
| 79 | 6,570 |
| 3 | 214 |
| 27 | 2,163 |
| 7 | 545 |
| 11 | 891 |
| 285 | 26,254 |
| 15 | 1,304 |
| 10 | 777 |
| 21 | 1,634 |
| 19 | 1,495 |
| 105 | 9,087 |
| 33 | 2,645 |
| 12 | 1,012 |
| 2,072 | 176,114 |


| Retail |  |
| ---: | :---: |
| Employee <br> Count |  |
| 733 |  |
| (Thousend $\$$ ) |  |
| 121 |  |


| Total |  |
| :---: | :---: |
| Employee Count | Wages (Thousand \$) |
| 785 | 43,051 |
| 400 | 35,540 |
| 508 | 30,952 |
| 433 | 23,335 |
| 2,746 | 194,905 |
| 1,538 | 136,521 |
| 1,110 | 96,854 |
| 526 | 38,651 |
| 50 | 1,079 |
| 1,624 | 99,689 |
| 1,468 | 77,507 |
| 63 | 8,074 |
| 186 | 9,348 |
| 1,085 | 64,582 |
| 1,200 | 70,306 |
| 468 | 23,511 |
| 577 | 41,882 |
| 543 | 30,822 |
| 759 | 57,823 |
| 1,088 | 62,800 |
| 1,018 | 80,871 |
| 958 | 78,407 |
| 1,604 | 103,829 |
| 1,189 | 69,188 |
| 760 | 43,599 |
| 1,077 | 79,013 |
| 327 | 21,156 |
| 253 | 15,905 |
| 248 | 16,056 |
| 1,115 | 89,794 |
| 759 | 58,707 |
| 1,293 | 110,126 |
| 2,811 | 227,712 |
| 2,731 | 154,218 |
| 1,168 | 125,086 |
| 1,589 | 104,249 |
| 1,861 | 173,549 |
| 328 | 19,418 |
| 2,617 | 181,354 |
| 275 | 18,775 |
| 981 | 57,031 |
| 229 | 11,356 |
| 1,074 | 47,713 |
| 7,833 | 769,677 |
| 333 | 24,640 |
| 640 | 44,794 |
| 1,609 | 100,374 |
| 842 | 56,095 |
| 751 | 74,727 |
| 1,342 | 74,585 |
| 341 | 28,842 |
| 57,110 | 4,208,083 |

Impact of the U.S. Consumer Propane Industry on U.S. and State Economies in 2018

Table 5: Propane $\left(\mathrm{C}_{3} \mathrm{H}_{8}\right)$ Employment and Wages Summary, 2018

|  | Production |  | Trans., Stor., Wholesaling |  | Retail |  | Total |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| State | Employee Count | $\qquad$ | Employee Count | Wages (Thousand \$) | Employee Count | Wages (Thousand \$) | Employee Count | $\qquad$ |
| Alabama | 107 | 12,197 | 38 | 3,097 | 733 | 37,555 | 878 | 52,849 |
| Alaska | 737 | 83,099 | 15 | 1,458 | 121 | 4,518 | 873 | 89,075 |
| Arizona | 0 | 5 | 11 | 6,790 | 498 | 28,692 | 508 | 35,487 |
| Arkansas | 21 | 2,408 | 29 | 2,353 | 415 | 21,668 | 466 | 26,430 |
| California | 721 | 82,058 | 162 | 13,106 | 2,425 | 160,511 | 3,308 | 255,675 |
| Colorado | 2,141 | 242,647 | 309 | 26,798 | 642 | 38,571 | 3,092 | 308,016 |
| Connecticut | 0 | 0 | 33 | 2,631 | 1,099 | 95,979 | 1,132 | 98,610 |
| Delaware | 4 | 605 | 18 | 1,428 | 518 | 37,975 | 540 | 40,007 |
| District of Columbia | 0 | 0 | 1 | 78 | 49 | 1,053 | 50 | 1,131 |
| Florida | 9 | 979 | 54 | 4,273 | 1,603 | 97,908 | 1,666 | 103,160 |
| Georgia | 0 | 0 | 111 | 8,968 | 1,431 | 74,525 | 1,542 | 83,492 |
| Hawaii | 2 | 251 | 12 | 934 | 58 | 7,680 | 72 | 8,865 |
| Idaho | 1 | 161 | 17 | 1,324 | 180 | 8,849 | 198 | 10,334 |
| Illinois | 141 | 16,555 | 174 | 14,383 | 976 | 53,814 | 1,291 | 84,752 |
| Indiana | 15 | 1,951 | 176 | 14,264 | 1,137 | 64,887 | 1,327 | 81,102 |
| lowa | 0 | 0 | -7 | -565 | 471 | 23,699 | 463 | 23,134 |
| Kansas | 348 | 39,619 | 412 | 33,925 | 311 | 16,092 | 1,071 | 89,636 |
| Kentucky | 51 | 5,924 | 36 | 2,921 | 512 | 27,703 | 599 | 36,548 |
| Louisiana | 848 | 98,699 | 164 | 14,020 | 394 | 17,367 | 1,405 | 130,086 |
| Maine | 0 | 0 | 41 | 3,250 | 1,074 | 61,719 | 1,115 | 64,968 |
| Maryland | 0 | 0 | 31 | 2,429 | 1,008 | 80,063 | 1,038 | 82,492 |
| Massachusetts | 0 | 0 | 34 | 2,734 | 946 | 77,498 | 981 | 80,232 |
| Michigan | 33 | 3,852 | 154 | 12,311 | 1,541 | 98,331 | 1,728 | 114,494 |
| Minnesota | 6 | 886 | 140 | 11,193 | 1,140 | 65,171 | 1,287 | 77,250 |
| Mississippi | 188 | 21,503 | 51 | 4,219 | 673 | 34,344 | 912 | 60,066 |
| Missouri | 0 | 39 | 129 | 10,390 | 1,034 | 75,543 | 1,163 | 85,972 |
| Montana | 95 | 10,804 | 29 | 2,377 | 281 | 16,402 | 406 | 29,582 |
| Nebraska | 8 | 891 | 325 | 26,614 | 142 | 6,726 | 475 | 34,230 |
| Nevada | 1 | 119 | 12 | 946 | 244 | 15,699 | 257 | 16,763 |
| New Hampshire | 0 | 0 | 46 | 3,646 | 1,100 | 88,581 | 1,146 | 92,228 |
| New Jersey | 10 | 1,408 | 31 | 2,482 | 745 | 57,413 | 786 | 61,303 |
| New Mexico | 1,969 | 222,514 | 110 | 10,203 | 526 | 25,003 | 2,605 | 257,719 |
| New York | 1 | 96 | 103 | 8,204 | 2,776 | 224,948 | 2,881 | 233,248 |
| North Carolina | 0 | 0 | 151 | 12,126 | 2,680 | 150,185 | 2,831 | 162,311 |
| North Dakota | 2,790 | 315,257 | 146 | 13,280 | 85 | 4,870 | 3,021 | 333,408 |
| Ohio | 522 | 59,657 | 416 | 34,328 | 1,258 | 71,018 | 2,195 | 165,003 |
| Oklahoma | 3,114 | 352,939 | 588 | 50,650 | 511 | 27,205 | 4,213 | 430,794 |
| Oregon | 0 | 0 | 23 | 1,814 | 320 | 18,815 | 343 | 20,629 |
| Pennsylvania | 476 | 54,501 | 239 | 19,753 | 2,362 | 154,871 | 3,076 | 229,125 |
| Rhode Island | 0 | 0 | 8 | 642 | 272 | 18,562 | 280 | 19,204 |
| South Carolina | 0 | 0 | 80 | 6,503 | 954 | 54,868 | 1,034 | 61,371 |
| South Dakota | 5 | 552 | 21 | 1,638 | 220 | 10,609 | 245 | 12,798 |
| Tennessee | 6 | 788 | 34 | 2,680 | 1,060 | 46,549 | 1,100 | 50,017 |
| Texas | 13,781 | 1,563,034 | 856 | 78,935 | 2,443 | 170,168 | 17,079 | 1,812,137 |
| Utah | 268 | 30,356 | 46 | 3,919 | 218 | 12,197 | 532 | 46,472 |
| Vermont | 0 | 0 | 29 | 2,337 | 631 | 44,017 | 660 | 46,354 |
| Virginia | 0 | 2 | 62 | 4,912 | 1,589 | 98,740 | 1,651 | 103,654 |
| Washington | 9 | 1,231 | 56 | 4,494 | 821 | 54,191 | 886 | 59,916 |
| West Virginia | 1,405 | 159,859 | 317 | 27,322 | 126 | 7,047 | 1,848 | 194,228 |
| Wisconsin | 0 | 10 | 100 | 7,952 | 1,308 | 71,937 | 1,409 | 79,899 |
| Wyoming | 341 | 38,491 | 37 | 3,042 | 202 | 13,682 | 580 | 55,215 |
| US Total | 30,173 | 3,425,946 | 6,207 | 529,509 | 43,864 | 2,776,019 | 80,245 | 6,731,474 |

Impact of the U.S. Consumer Propane Industry on U.S. and State Economies in 2018

Table 6: Total NGLs / LRGs Employment and Wages Summary, 2018

|  | Production |  |
| :---: | :---: | :---: |
| State | Employee Count | Wages (Thousand \$) |
| Alabama | 257 | 29,930 |
| Alaska | 1,774 | 205,168 |
| Arizona | 0 | 12 |
| Arkansas | 51 | 5,936 |
| California | 1,729 | 201,339 |
| Colorado | 5,147 | 597,460 |
| Connecticut | 0 | 0 |
| Delaware | 9 | 1,269 |
| District of Columbia | 0 | 0 |
| Florida | 21 | 2,416 |
| Georgia | 0 | 0 |
| Hawaii | 4 | 526 |
| Idaho | 3 | 396 |
| Illinois | 334 | 39,804 |
| Indiana | 34 | 4,366 |
| Iowa | 0 | 0 |
| Kansas | 834 | 97,214 |
| Kentucky | 121 | 14,308 |
| Louisiana | 2,011 | 238,476 |
| Maine | 0 | 0 |
| Maryland | 0 | 0 |
| Massachusetts | 0 | 0 |
| Michigan | 80 | 9,371 |
| Minnesota | 13 | 1,858 |
| Mississippi | 449 | 52,540 |
| Missouri | 1 | 96 |
| Montana | 229 | 26,597 |
| Nebraska | 19 | 2,203 |
| Nevada | 2 | 290 |
| New Hampshire | 0 | 0 |
| New Jersey | 21 | 2,954 |
| New Mexico | 4,739 | 548,867 |
| New York | 2 | 237 |
| North Carolina | 0 | 0 |
| North Dakota | 6,715 | 777,684 |
| Ohio | 1,250 | 146,036 |
| Oklahoma | 7,485 | 868,953 |
| Oregon | 0 | 0 |
| Pennsylvania | 1,139 | 133,252 |
| Rhode Island | 0 | 0 |
| South Carolina | 0 | 0 |
| South Dakota | 12 | 1,364 |
| Tennessee | 14 | 1,767 |
| Texas | 33,115 | 3,846,091 |
| Utah | 644 | 74,769 |
| Vermont | 0 | 0 |
| Virginia | 0 | 5 |
| Washington | 18 | 2,583 |
| West Virginia | 3,375 | 392,815 |
| Wisconsin | 0 | 21 |
| Wyoming | 822 | 95,078 |
| US Total | 72,472 | 8,424,052 |


| Trans., Stor., Wholesaling |  |
| :---: | :---: |
| Employee Count | Wages (Thousand \$) |
| 64 | 5,354 |
| 39 | 3,653 |
| 39 | 3,918 |
| 124 | 9,907 |
| 383 | 31,097 |
| 1,526 | 127,157 |
| 19 | 1,518 |
| 11 | 942 |
| 1 | 45 |
| 31 | 2,491 |
| 74 | 6,427 |
| 7 | 588 |
| 10 | 778 |
| 764 | 62,669 |
| 289 | 24,061 |
| 213 | 16,967 |
| 1,913 | 156,034 |
| 123 | 9,919 |
| 1,110 | 91,006 |
| 24 | 1,875 |
| 18 | 1,401 |
| 20 | 1,577 |
| 115 | 9,269 |
| 95 | 7,677 |
| 147 | 12,160 |
| 171 | 14,102 |
| 19 | 1,635 |
| 638 | 53,559 |
| 7 | 548 |
| 26 | 2,104 |
| 194 | 15,477 |
| 318 | 28,812 |
| 60 | 4,734 |
| 96 | 8,175 |
| 236 | 22,862 |
| 837 | 70,645 |
| 1,397 | 121,776 |
| 13 | 1,047 |
| 1,369 | 111,039 |
| 5 | 371 |
| 56 | 4,931 |
| 12 | 950 |
| 21 | 1,675 |
| 8,120 | 672,248 |
| 621 | 49,926 |
| 17 | 1,348 |
| 36 | 2,834 |
| 99 | 7,913 |
| 389 | 36,861 |
| 58 | 4,588 |
| 147 | 12,046 |
| 22,113 | 1,840,693 |


| Retail |  |
| :---: | :---: |
| Employee Count | Wages (Thousand \$) |
| 733 | 37,555 |
| 121 | 4,518 |
| 498 | 28,692 |
| 415 | 21,668 |
| 2,425 | 160,511 |
| 642 | 38,571 |
| 1,099 | 95,979 |
| 518 | 37,975 |
| 49 | 1,053 |
| 1,603 | 97,908 |
| 1,431 | 74,525 |
| 58 | 7,680 |
| 180 | 8,849 |
| 976 | 53,814 |
| 1,137 | 64,887 |
| 471 | 23,699 |
| 311 | 16,092 |
| 512 | 27,703 |
| 394 | 17,367 |
| 1,074 | 61,719 |
| 1,008 | 80,063 |
| 946 | 77,498 |
| 1,541 | 98,331 |
| 1,140 | 65,171 |
| 673 | 34,344 |
| 1,034 | 75,543 |
| 281 | 16,402 |
| 142 | 6,726 |
| 244 | 15,699 |
| 1,100 | 88,581 |
| 745 | 57,413 |
| 526 | 25,003 |
| 2,776 | 224,948 |
| 2,680 | 150,185 |
| 85 | 4,870 |
| 1,258 | 71,018 |
| 511 | 27,205 |
| 320 | 18,815 |
| 2,362 | 154,871 |
| 272 | 18,562 |
| 954 | 54,868 |
| 220 | 10,609 |
| 1,060 | 46,549 |
| 2,443 | 170,168 |
| 218 | 12,197 |
| 631 | 44,017 |
| 1,589 | 98,740 |
| 821 | 54,191 |
| 126 | 7,047 |
| 1,308 | 71,937 |
| 202 | 13,682 |


| Total |  |
| :---: | :---: |
| Employee Count | Wages (Thousand \$) |
| 1,054 | 72,840 |
| 1,934 | 213,340 |
| 536 | 32,622 |
| 590 | 37,511 |
| 4,537 | 392,947 |
| 7,315 | 763,188 |
| 1,118 | 97,497 |
| 538 | 40,186 |
| 50 | 1,098 |
| 1,655 | 102,816 |
| 1,505 | 80,952 |
| 69 | 8,794 |
| 193 | 10,023 |
| 2,074 | 156,287 |
| 1,459 | 93,314 |
| 683 | 40,665 |
| 3,058 | 269,340 |
| 755 | 51,930 |
| 3,515 | 346,849 |
| 1,098 | 63,594 |
| 1,025 | 81,465 |
| 966 | 79,075 |
| 1,735 | 116,971 |
| 1,248 | 74,707 |
| 1,269 | 99,044 |
| 1,206 | 89,741 |
| 530 | 44,634 |
| 799 | 62,488 |
| 253 | 16,537 |
| 1,126 | 90,685 |
| 960 | 75,845 |
| 5,583 | 602,681 |
| 2,838 | 229,919 |
| 2,777 | 158,361 |
| 7,036 | 805,416 |
| 3,344 | 287,699 |
| 9,393 | 1,017,934 |
| 333 | 19,861 |
| 4,869 | 399,161 |
| 277 | 18,932 |
| 1,010 | 59,800 |
| 244 | 12,922 |
| 1,094 | 49,991 |
| 43,677 | 4,688,507 |
| 1,483 | 136,891 |
| 648 | 45,365 |
| 1,624 | 101,579 |
| 937 | 64,686 |
| 3,890 | 436,722 |
| 1,366 | 76,546 |
| 1,172 | 120,806 |

### 3.2. Manufacturing of Propane Equipment, Engines, and Appliances

Manufacturing is a major economic driver of the U.S. economy, and according to the Bureau of Economic Analysis accounted for over 2.32 million jobs in 2018. ${ }^{13}$ The total number of manufacturing jobs by state and the share that these jobs represent are shown in Figure 5 below. Across the U.S., manufacturing average 11.4 percent of total jobs. Several Midwestern and Southern U.S. states represent the states where manufacturing accounts for the largest share of employment, including Indiana, Louisiana, Michigan, and Wisconsin. California, Texas, Ohio, and Illinois have the largest number of manufacturing jobs, totaling 778,000 in 2018, roughly one third of all manufacturing jobs.
Figure 5. Manufacturing Employment Percentages by State


Source: U.S. Census Annual Survey of Manufacturing, U.S. Bureau of Economic Analysis
Jobs Supported by the Manufacturing and Installation of Propane Equipment
The number of jobs supported by the manufacturing and installation of propane appliances and engines are estimated by the sector and type of equipment manufactured. The manufacturing and installation of equipment used by consumers of retail (odorized) propane support a total of almost 48,000 jobs, including 17,000 direct manufacturing jobs. These manufacturing jobs in turn support an additional 31,000 indirect/induced jobs across the country.
The residential sector supports a total of about 42,000 jobs, including 15,000 manufacturing jobs and 27,000 supporting jobs. This estimate accounts for the share of propane appliances that built overseas and imported into the U.S. ${ }^{14}$ Table 7 shows the numbers of direct and indirect jobs

[^4]supported by the spending on new appliances, engines, and other applications that utilize odorized propane in 2018.
Table 7. Employment from Manufacturing Activities

| Manufacturing Category | Direct | Indirect | Induced | Total |
| :---: | :---: | :---: | :---: | :---: |
| Residential Sector | 15,154 | 10,452 | 16,339 | 41,945 |
| New Construction | 2,659 | 1,834 | 2,867 | 7,361 |
| Conversions / Upgrades | 789 | 544 | 851 | 2,184 |
| Appliance Replacements | 7,632 | 5,264 | 8,228 | 21,123 |
| Propane BBQs | 4,074 | 2,810 | 4,393 | 11,277 |
| Commercial Sector | 375 | 259 | 404 | 1,037 |
| Internal Combustion Engines | 1,557 | 1,074 | 1,679 | 4,310 |
| Forklifts | 1,233 | 850 | 1,329 | 3,412 |
| School Buses | 99 | 68 | 107 | 274 |
| LDV/MDVs | 92 | 63 | 99 | 254 |
| Irrigation | 134 | 93 | 145 | 371 |
| Agricultural Products | 119 | 82 | 128 | 329 |
| Industrial / Other | 99 | 68 | 106 | 273 |
|  |  |  |  |  |
| Total Impact | 17,304 | 11,935 | 18,656 | 47,894 |

Source: ICF

## 4. Direct Economic Impact Results

### 4.1. Economic Impact from Production, Transportation, and Consumption

The study of the impact of the U.S. consumer propane industry on the national and state economies is based upon a bottom-up approach to economic value assessment. Because the odorized propane industry sources its product from total U.S. purity propane supply, and because that purity propane is the product of both the refining and gas processing industries output of natural gas liquids (NGLs) and liquid refinery gasses (LRGs), ICF's approach to value calculation for the odorized propane industry attempts to trace the flow of all NGLs through the economy from the wellhead to the burner tip across all sources of production.

To estimate the state level direct economic impact of the odorized propane industry, the study used the 2018 Retail Propane Sales Report published by PERC for the odorized propane sales by sector, ${ }^{15}$ to allocate the national direct economic impacts volumes among the states. A national summary of the sector specific retail propane consumption for 2018 is shown in Table 8 below.

Table 8. 2018 National-Level Odorized Propane Consumption and Expenditures by Sector

| Retail Sector | Consumption <br> (Million Gallon) | Percent of Total <br> Consumption | Expenditures <br> (\$Millions) | Percent of Total <br> Expenditures |
| :--- | :---: | :---: | :---: | :---: |
| Residential | 5,184 | $55.63 \%$ | 14,535 | $61.06 \%$ |
| Commercial | 1,924 | $20.65 \%$ | 4,984 | $23.40 \%$ |
| Sales to Resellers | 354 | $3.80 \%$ | 568 | $2.30 \%$ |
| Internal Combustion | 479 | $5.14 \%$ | 844 | $5.60 \%$ |
| Industrial | 412 | $4.42 \%$ | 931 | $6.30 \%$ |
| Agricultural | 966 | $10.36 \%$ | 1,941 | $9.00 \%$ |
| Total U.S. Odorized Propane Demand | $\mathbf{9 , 3 2 0}$ |  | $\mathbf{2 3 , 8 0 3}$ |  |
| SOM |  |  |  |  |

Source: ICF, 2018 Retail Propane Sales Report
Various data sources are also used to estimate the value of these gallons across the federal and state economies. These include data reported by Bloomberg, industry publications on wholesale and regional rack prices for propane, EIA reported retail propane prices for the heating season, and ICF's modeled estimates for retail propane prices at the state level for all months and sectors not reported by the EIA.

This comprehensive approach to volume and price aggregation allows for the estimation of not only the total value of odorized propane on the U.S. market, but also of all purity propane, ethane, butanes, and pentanes plus. National-level estimates for total value along the full production chain for odorized propane and purity NGLs are found in Table 9 through Table 13. Detailed estimates of the impact of the odorized, total purity propane industry, and all NGLs are found in Table 15, Table 16, and Table 17.

### 4.1.1 Upstream

Tracing the value added by the propane industry in the upstream sector begins by accounting for crude oil and natural gas inputs into refining and gas processing facilities. ICF used EIA data in combination with in-house proprietary information, such as gas and crude oil quality and transport infrastructure (pipelines, barges, rail, etc.) capacity, to estimate production of crude oil, lease condensate, and natural gas at the state level (see Table 14). This data was then combined with

[^5]information on the composition of gas produced and refinery yields from various crudes to estimate total quantities and values of natural gas liquids - and subsequently odorized propane - produced at the state level.

- ICF estimates the total value of natural gas liquids (also referred to as Liquefied Refinery Gasses) coming from domestic crude at nearly $\$ 4.1$ billion, with odorized propane's share of LRGs in domestic crude at $\$ 725$ million.
- We estimate the value of NGLs produced from U.S. natural gas production at nearly $\$ 10.7$ billion, with odorized propane's share of NGLs in raw domestic gas at $\$ 1.3$ billion.

The total value of imported raw commodities and products is estimated at $\$ 4.0$ billion. This figure includes all LRGs in imported crude and natural gas, $\$ 1.4$ billion of which is contributed by Canadian crude. The value of imported raw commodities in the odorized propane segment is $\$ 0.7$ billion, including $\$ 249$ million of Canadian crude.

- U.S. gas processors extracted NGLs valued at \$456 million from imported Canadian natural gas, including $\$ 48$ million in odorized propane.
- $\$ 2.1$ billion of imported natural gas liquids entered the U.S. in 2015, including $\$ 1.5$ billion of NGLs imported from Canada.
- Odorized propane's share of imported NGLs value stood at $\$ 371$ million in 2015, of which $\$ 336$ million was attributed to imports from Canada.


### 4.1.2 Midstream

Accounting for value added generated by the midstream sector includes estimates for the economic contribution from the refining and gas processing sectors, fractionation sector, and pipeline and other transportation, storage, and wholesale market activities. As with upstream values, ICF's calculations begin with an accounting of the total value produced by the natural gas liquids complex, a value subsequently apportioned first to individual purity products, and finally from purity propane to odorized propane.

The share of refining revenues generated by natural gas liquids, and by propane, and odorized propane, specifically, continues to fall, resulting in declining value added from the refining sector. From 2015 to 2018, U.S. oil prices increased by 34 percent, from $\$ 48.66$ per barrel in 2015 to $\$ 65.23$ per barrel in 2018. Over this same time period propane prices increased by 92 percent due to a tightening of the relative price between propane and global oil prices, with Mont Belvieu propane prices averaging $87.8 \$ /$ gallon in 2018 . Propane's share of total refinery output (measured in retail value) declined slightly, from 1.14 percent in 2015 to 1.01 percent in 2018, while the share of production from refineries declined from 2.4 percent in 2015 to 2.3 percent in 2018.
For gas processors and fractionators, the continued low natural gas prices mean liquids produced out of the raw natural gas provided a significant uplift to dry gas prices, with the notable exception of ethane. Due to an over-supplied market, ethane traded near parity with natural gas in 2018. Despite this anomaly, overall declines in the value of crude oil and related petroleum products relative to natural gas resulted in the value added from gas processing generating 56.8 percent of the value in NGLs produced from natural gas in 2018, down from 69 percent in 2015. The majority of this value was generated from heavier NGLs, specifically butanes and pentanes, accounting for $\$ 8.6$ billion in added value. Propane accounted for $\$ 3.7$ billion of all value added generated by the gas processors in 2018, while $\$ 1.3$ billion, or 11 percent of the total, can be attributed to odorized propane.

The trend of an increasingly higher share of value from natural gas production generated from the liquids extracted continues to favor natural gas development to more NGL rich areas of production. There has also been a dramatic increase in associated gas production from expanding
development of U.S. tight oil resources, such as the Bakken and Eagle Ford shales and Permian region. Associated gas production contains high levels of NGLs within the natural gas production stream, which has supported the dramatic increase in domestic NGL production from gas processing. This expansion in NGL production has facilitated an increase in value despite a reduction in the price for NGL prices.

The industry's focus on the development of NGL rich gas resources has also occurred in Canada, resulting in higher NGLs production, bolstered by the development of the Montney tight gas resources and Duvernay shale. Total NGL imports from Canada decreased from 2,239 million gallons in 2015 to 1,799 million gallons in 2018, including those of propane, which decreased from 1,643 million gallons in 2015 to 1,306 million gallons in 2018. The value of odorized propane imported from Canada, from both refineries and gas processing plants, was $\$ 192$ million in 2018, down sharply from the $\$ 336$ million in 2015.

ICF used in-house data on pipeline capacity and throughput, pipeline tolls, and estimates of total transportation costs for "wet" natural gas and natural gas liquids to calculate the value added by the transportation sector. These estimates consider value added throughout the entire transportation sector, which includes gathering lines, intra- and inter-PAD pipelines moving various grades of NGLs from producers and fractionators to wholesalers and distributors, and terminaling services offered at export and import facilities throughout the country.
ICF estimates midstream value added for all NGL products to be:

- \$3,393 million for long-distance transportation of NGLs, including \$205 million for longdistance transport attributed to odorized propane.
- $\$ 1,346$ million for intra-PAD transportation of NGLs, including $\$ 152$ million for intra-PAD transport attributed to odorized propane.
- $\$ 7,633$ million for storage and wholesaling services of NGLs, including $\$ 808$ million for wholesaling services attributed to odorized propane.
- $\$ 798$ million for terminaling at NGL export and import terminals, a sharp increase from $\$ 100$ million in 2012. The terminaling of propane accounts for $2 / 3$ of the total value.


### 4.1.3 Downstream

The total retail value for odorized propane is calculated based on total volumes of propane delivered to final consumers, by category of consumer, as well as the prices paid by those consumers, based on consumer type and geography. For this study ICF based volumes of odorized propane sold in the consumer market on the 2018 Retail Propane Sales Report published by PERC and ICF. For those states and customer types where PERC and ICF withholds data to avoid disclosure of individual company data, ICF estimated values based on in-house modeling using the Propane Database and Forecast Model (PDFM). ${ }^{16}$ Pricing information for odorized propane is drawn from the Energy Information Administration's database of retail prices by region ${ }^{17}$ and industry, wholesale and rack prices reported on Bloomberg, state heating fuel pricing reports, as

[^6]well as ICF's own estimates of retail prices based on in-house modeling and market data. The total value added attributable to the retail segment of the value chain is then calculated as the difference between the value of product at the wholesale level and the value of that product at the point of delivery to the ultimate consumer.

For 2018, value added by the retail sector totals just under $\$ 10.6$ billion dollars - a 74 percent increase over 2012 value of $\$ 6.1$ billion. On a per-gallon basis, average retail markup across all consumer groups increased from an estimated 72.7 ¢/gallon in 2012 to $\$ 113$ \$/gallon in 2015. As a percentage of total added value the contribution of the odorized propane segment, the added value from the retail portion increased from 39.8 percent in 2012 to nearly 60 percent in 2015, due in large part to the weakening wholesale propane prices while retail prices remained more constant.

### 4.1.4 Retailer Spending

There are over 4,000 propane retailers across the U.S. The majority of these propane retailers are small private enterprises. In addition, there are a number of independent retailers that can operate in either a single state or have regional operations, cooperatives, and larger national retailers that are structured as Master Limited Partnerships. The figure below shows data from LP Gas Magazine's February 2019 Issue, which provides details on the 50 largest public and private propane retailers across the county that choose to report their data to the Magazine. ${ }^{18}$ Based on the total 2018 retail propane sales, the companies represented in the LP Gas Top 50 retailers accounted for 44 percent of sales that year. Master Limited Partnership category accounted for 23 percent of 2018 retail propane sales. ${ }^{19}$ Companies that did not submit data to LP Gas Magazine, or were smaller than the 50 companies included in the survey accounted for about 56 percent of 2018 sales, and are not categorized in the LP Gas Top 50 rankings.

Figure 6. Share of 2018 Retail Propane Sales by Company Type


Source: LP Gas Magazine - February 2019 Issue of Top 50 Retailers

[^7]
## Retailer Capital and Operating and Maintenance Spending

The retail propane sector is not a capital intensive industry compared to the storage and distribution of other primary fuels to consumers. On an absolute and relative basis, the retail propane sector has a much smaller share of capital spending on infrastructure when compared to either the natural gas or power sectors. As such, the capital spending is less of a driver of economic activity for the retail propane sector when compared to the spending and economic contribution of other components, such as the manufacturing and installation of propane engines and appliances and operating and maintenance spending by propane retailers.
ICF estimates that propane retailers spent a total of $\$ 12.5$ billion in 2018, made up of $\$ 600$ million on capital investment and roughly $\$ 11.9$ billion on operations \& maintenance activities. This estimate is based on analysis of the spending from the largest public propane retailers operating in the U.S. ${ }^{20}$ and an estimate on the capital and O\&M spending levels for non-public retailers.

Figure 7. U.S. Propane Retailer Capital and O\&M Spending by State


Source: ICF

[^8]
## Explanation of Indirect and Induced Economic Impacts

In addition to the direct impact an industry has on the economy, indirect impacts are generated that affect employment and wages, as well as value added that can be attributed back to that industry. The natural gas liquids industry indirectly impacts the U.S. economy through several channels. These include the inputs it procures, the taxes paid by the industry and its employees, and the activity generated by the products it sells, as well as any positive impact the industry generates further down the value chain in terms of demand spurred by the wages it pays and services it buys (generally referred to as induced impact). ICF's estimates for the indirect and induced value-added generated by the odorized propane industry can be found in Table 13 below.

The 2018 ICF study used national level estimates of indirect and induced value added, and allocated this value throughout the U.S. economy at the state level. In 2018, the indirect and induced contribution to the U.S. GDP from the odorized propane sector is estimated at over \$36.6 billion, up from $\$ 30.8$ billion in 2015. Including direct value added, odorized propane's contribution to the U.S. GDP is estimated at $\$ 53.6$ billion in 2018, an 18 percent increase from the $\$ 45.4$ billion GDP contribution the U.S. economy in 2015. The increase from in Total Value added to the U.S. GDP is largely due to a 10.4 percent increase in retail propane consumption, increased propane production, and an increase in the price of retail propane sales. Excluding value in imported product and raw materials, the domestic component of the odorized propane industry was nearly $\$ 51$ billion in 2018, an increase of 16 percent from the $\$ 43.8$ billion in 2015.

Impact of the U.S. Consumer Propane Industry on U.S. and State Economies in 2018

Table 9: State Value Added, Employment, and Wages for Odorized Propane, 2018

| State | Value Added (\$1,000) |  |  | Employment | Wages (\$1,000) |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | Direct |  <br> Induced | Total | Direct | Direct |
| Alabama | 136,152 | 20,193 | 156,345 | 785 | 43,051 |
| Alaska | 62,456 | 233,655 | 296,111 | 400 | 35,540 |
| Arizona | 51,553 | 245,157 | 296,710 | 508 | 30,952 |
| Arkansas | 100,300 | 119,229 | 219,528 | 433 | 23,335 |
| California | 300,604 | 1,073,817 | 1,374,420 | 2,746 | 194,905 |
| Colorado | 563,497 | 1,011,227 | 1,574,724 | 1,538 | 136,521 |
| Connecticut | 93,908 | 403,504 | 497,412 | 1,110 | 96,854 |
| Delaware | 72,615 | 149,630 | 222,245 | 526 | 38,651 |
| District of Columbia | 5,369 | 90,867 | 96,236 | 50 | 1,079 |
| Florida | 201,299 | 570,070 | 771,369 | 1,624 | 99,689 |
| Georgia | 226,132 | 537,924 | 764,056 | 1,468 | 77,507 |
| Hawaii | 14,868 | 303,842 | 318,711 | 63 | 8,074 |
| Idaho | 66,090 | 339,921 | 406,011 | 186 | 9,348 |
| Illinois | 677,076 | 1,156,225 | 1,833,301 | 1,085 | 64,582 |
| Indiana | 429,420 | 752,536 | 1,181,956 | 1,200 | 70,306 |
| Iowa | 829,128 | 1,109,325 | 1,938,453 | 468 | 23,511 |
| Kansas | 323,677 | 690,700 | 1,014,377 | 577 | 41,882 |
| Kentucky | 198,799 | 504,162 | 702,961 | 543 | 30,822 |
| Louisiana | 322,096 | 590,939 | 913,035 | 759 | 57,823 |
| Maine | 88,238 | 507,974 | 596,212 | 1,088 | 62,800 |
| Maryland | 159,625 | 634,705 | 794,330 | 1,018 | 80,871 |
| Massachusetts | 90,876 | 524,303 | 615,179 | 958 | 78,407 |
| Michigan | 1,043,473 | 1,970,636 | 3,014,109 | 1,604 | 103,829 |
| Minnesota | 895,284 | 1,617,032 | 2,512,317 | 1,189 | 69,188 |
| Mississippi | 158,251 | 515,975 | 674,226 | 760 | 43,599 |
| Missouri | 521,869 | 1,316,835 | 1,838,703 | 1,077 | 79,013 |
| Montana | 112,549 | 294,894 | 407,443 | 327 | 21,156 |
| Nebraska | 221,663 | 513,786 | 735,449 | 253 | 15,905 |
| Nevada | 22,243 | 173,313 | 195,556 | 248 | 16,056 |
| New Hampshire | 117,773 | 270,246 | 388,018 | 1,115 | 89,794 |
| New Jersey | 113,599 | 313,304 | 426,903 | 759 | 58,707 |
| New Mexico | 305,346 | 559,021 | 864,367 | 1,293 | 110,126 |
| New York | 573,372 | 1,130,688 | 1,704,060 | 2,811 | 227,712 |
| North Carolina | 421,227 | 792,153 | 1,213,381 | 2,731 | 154,218 |
| North Dakota | 537,227 | 836,487 | 1,373,714 | 1,168 | 125,086 |
| Ohio | 712,470 | 1,561,668 | 2,274,138 | 1,589 | 104,249 |
| Oklahoma | 764,111 | 1,172,808 | 1,936,920 | 1,861 | 173,549 |
| Oregon | 40,178 | 501,676 | 541,854 | 328 | 19,418 |
| Pennsylvania | 624,543 | 1,131,076 | 1,755,619 | 2,617 | 181,354 |
| Rhode Island | 19,385 | 440,890 | 460,274 | 275 | 18,775 |
| South Carolina | 113,434 | 465,184 | 578,618 | 981 | 57,031 |
| South Dakota | 149,979 | 359,006 | 508,985 | 229 | 11,356 |
| Tennessee | 212,157 | 620,324 | 832,481 | 1,074 | 47,713 |
| Texas | 2,589,189 | 4,046,925 | 6,636,114 | 7,833 | 769,677 |
| Utah | 89,622 | 415,914 | 505,536 | 333 | 24,640 |
| Vermont | 77,983 | 399,936 | 477,919 | 640 | 44,794 |
| Virginia | 267,839 | 775,782 | 1,043,621 | 1,609 | 100,374 |
| Washington | 97,717 | 560,490 | 658,208 | 842 | 56,095 |
| West Virginia | 398,690 | 722,352 | 1,121,041 | 751 | 74,727 |
| Wisconsin | 730,113 | 1,269,037 | 1,999,149 | 1,342 | 74,585 |
| Wyoming | 76,715 | 279,488 | 356,203 | 341 | 28,842 |
| U.S. State Totals | 17,021,781 | 36,596,829 | 53,618,610 | 57,110 | 4,208,083 |
| Imports | 862,367 |  | 862,367 |  |  |
| Total Including Imports | 17,884,148 | 36,596,829 | 54,480,977 |  |  |

Impact of the U.S. Consumer Propane Industry on U.S. and State Economies in 2018

Table 10: State Production of Odorized Propane $\left(\mathrm{C}_{3} \mathrm{H}_{8}\right), 2018$

|  | Volume (1,000 Gal) |  |  |
| :---: | :---: | :---: | :---: |
| State | Refinery | Gas Plant | Total |
| Alabama | 8,704 | 35,389 | 44,093 |
| Alaska | 6,424 | 34,996 | 41,420 |
| Arizona | - | - | - |
| Arkansas | 1,147 | 848 | 1,994 |
| California | 84,616 | 16,592 | 101,208 |
| Colorado | 3,265 | 694,748 | 698,013 |
| Connecticut | - | - | - |
| Delaware | 14,673 | - | 14,673 |
| District of Columbia | - | - | - |
| Florida | - | 673 | 673 |
| Georgia | - | - | - |
| Hawaii | 5,470 | - | 5,470 |
| Idaho | - | 553 | 553 |
| Illinois | 76,955 | 38,528 | 115,483 |
| Indiana | 35,309 | - | 35,309 |
| Iowa | - | - | - |
| Kansas | 24,085 | 91,203 | 115,288 |
| Kentucky | 21,551 | 15,636 | 37,187 |
| Louisiana | 341,331 | 252,276 | 593,607 |
| Maine | - | - | - |
| Maryland | - | - | - |
| Massachusetts | - | - | - |
| Michigan | 10,494 | 5,026 | 15,518 |
| Minnesota | 25,608 | - | 25,608 |
| Mississippi | 35,966 | 52,118 | 88,084 |
| Missouri | - | - | - |
| Montana | 6,373 | 5,441 | 11,814 |
| Nebraska | - | - | - |
| Nevada | 180 | - | 180 |
| New Hampshire | - | - | - |
| New Jersey | 34,150 | - | 34,150 |
| New Mexico | 4,775 | 367,423 | 372,199 |
| New York | - | - | - |
| North Carolina | - | - | - |
| North Dakota | 5,386 | 488,676 | 494,062 |
| Ohio | 46,182 | 183,358 | 229,540 |
| Oklahoma | 33,304 | 949,741 | 983,046 |
| Oregon | - | - | - |
| Pennsylvania | 43,602 | 201,350 | 244,951 |
| Rhode Island | - | - | - |
| South Carolina | - | - | - |
| South Dakota | - | - | - |
| Tennessee | 13,783 | 851 | 14,633 |
| Texas | 560,199 | 3,022,628 | 3,582,826 |
| Utah | 6,370 | 55,559 | 61,929 |
| Vermont | - | - | - |
| Virginia | - | - | - |
| Washington | 26,859 | - | 26,859 |
| West Virginia | 523 | 628,512 | 629,034 |
| Wisconsin | 284 | - | 284 |
| Wyoming | 5,634 | 645 | 6,280 |
| U.S. Total | 1,483,201 | 7,142,768 | 8,625,967 |


| Percentage of National Total |  |  |
| :---: | :---: | :---: |
| $\begin{gathered} \text { of } \\ \text { Ref. Prod. } \end{gathered}$ | of Gas Pit. <br> Production | of Total Production |
| 0.59\% | 0.50\% | 0.51\% |
| 0.43\% | 0.49\% | 0.48\% |
| 0.00\% | 0.00\% | 0.00\% |
| 0.08\% | 0.01\% | 0.02\% |
| 5.70\% | 0.23\% | 1.17\% |
| 0.22\% | 9.73\% | 8.09\% |
| 0.00\% | 0.00\% | 0.00\% |
| 0.99\% | 0.00\% | 0.17\% |
| 0.00\% | 0.00\% | 0.00\% |
| 0.00\% | 0.01\% | 0.01\% |
| 0.00\% | 0.00\% | 0.00\% |
| 0.37\% | 0.00\% | 0.06\% |
| 0.00\% | 0.01\% | 0.01\% |
| 5.19\% | 0.54\% | 1.34\% |
| 2.38\% | 0.00\% | 0.41\% |
| 0.00\% | 0.00\% | 0.00\% |
| 1.62\% | 1.28\% | 1.34\% |
| 1.45\% | 0.22\% | 0.43\% |
| 23.01\% | 3.53\% | 6.88\% |
| 0.00\% | 0.00\% | 0.00\% |
| 0.00\% | 0.00\% | 0.00\% |
| 0.00\% | 0.00\% | 0.00\% |
| 0.71\% | 0.07\% | 0.18\% |
| 1.73\% | 0.00\% | 0.30\% |
| 2.42\% | 0.73\% | 1.02\% |
| 0.00\% | 0.00\% | 0.00\% |
| 0.43\% | 0.08\% | 0.14\% |
| 0.00\% | 0.00\% | 0.00\% |
| 0.01\% | 0.00\% | 0.00\% |
| 0.00\% | 0.00\% | 0.00\% |
| 2.30\% | 0.00\% | 0.40\% |
| 0.32\% | 5.14\% | 4.31\% |
| 0.00\% | 0.00\% | 0.00\% |
| 0.00\% | 0.00\% | 0.00\% |
| 0.36\% | 6.84\% | 5.73\% |
| 3.11\% | 2.57\% | 2.66\% |
| 2.25\% | 13.30\% | 11.40\% |
| 0.00\% | 0.00\% | 0.00\% |
| 2.94\% | 2.82\% | 2.84\% |
| 0.00\% | 0.00\% | 0.00\% |
| 0.00\% | 0.00\% | 0.00\% |
| 0.00\% | 0.00\% | 0.00\% |
| 0.93\% | 0.01\% | 0.17\% |
| 37.77\% | 42.32\% | 41.54\% |
| 0.43\% | 0.78\% | 0.72\% |
| 0.00\% | 0.00\% | 0.00\% |
| 0.00\% | 0.00\% | 0.00\% |
| 1.81\% | 0.00\% | 0.31\% |
| 0.04\% | 8.80\% | 7.29\% |
| 0.02\% | 0.00\% | 0.00\% |
| 0.38\% | 0.01\% | 0.07\% |
| 100.00\% | 100.00\% | 100.00\% |

Impact of the U.S. Consumer Propane Industry on U.S. and State Economies in 2018

Table 11: State Level Value Summary for Odorized Propane ( $\mathrm{C}_{3} \mathrm{H}_{8}$ ), 2018


Impact of the U.S. Consumer Propane Industry on U.S. and State Economies in 2018

Table 12: State Level Value Summary for Propane $\left(\mathrm{C}_{3} \mathrm{H}_{8}\right), 2018$

|  |  |  |  |  |  | Value Added | \$1,000) |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| State | $\begin{aligned} & \text { SUB } \\ & \text { PAD } \end{aligned}$ | Supply | Transportation, Storage, and Wholesaling Markup | Wholesale Value | Retail Markup | Direct <br> Value <br> Added | In-state Contribution To GDP | Indirect <br> Manulacturing <br> Allocation Contribution | Induced <br> EDP <br> Allocation Contribution | Contribution to GDP | Total <br> Contribution <br> To GDP |
| Alabama | 3 | 55,497 | 11,850 | 67,346 | 107,726 | 175,072 | 227,594 | 87,443 | -320,212 | -5,175 | 169,898 |
| Alaska | 5 | 168,067 | 3,346 ${ }^{\prime \prime}$ | 171,413 | 4,623 | 176,036 | 228,847 | 3,954 | 222,369 | 455,170 | 631,206 |
| Arizona | 5 | 6 | 8,828 ${ }^{\prime \prime}$ | 8,834 | 42,723 | 51,557 | 67,024 | 68,754 | 195,685 | 331,463 | 383,020 |
| Arkansas | 3 | 4,059 | 9,720 ${ }^{\prime}$ | 13,779 | 90,456 | 104,235 | 135,505 | 45,695 | -62,263 | 118,937 | 223,172 |
| California | 5 | 128,978 | 53,446 ${ }^{\prime \prime}$ | 182,423 | 209,756 | 392,179 | 509,833 | 729,301 | 284,633 | 1,523,766 | 1,915,946 |
| Colorado | 4 | 1,076,849 | 80,018 ${ }^{\prime \prime}$ | 1,156,867 | 167,912 | 1,324,779 | 1,722,212 | 57,898 | 355,791 | 2,135,901 | 3,460,679 |
| Connecticut | 1-A | 0 | 11,629 ${ }^{\prime \prime}$ | 11,629 | 82,279 | 93,908 | 122,081 | 70,866 | 346,896 | 539,842 | 633,751 |
| Delaware | 1-B | 7,283 | 5,962 ${ }^{\prime \prime}$ | 13,245 | 65,099 | 78,344 | 101,847 | 10,828 | 71,158 | 183,834 | 262,178 |
| District of Columbia | 1-B | 0 | 344 | 344 | 5,025 | 5,369 | 6,980 | 0 | 124,527 | 131,507 | 136,876 |
| Florida | 1-C | 2,164 | 18,839 ${ }^{\prime \prime}$ | 21,003 | 181,760 | 202,763 | 263,592 | 128,673 | 329,107 | 721,371 | 924,134 |
| Georgia | 1-C | 0 | 34,433 ${ }^{\prime \prime}$ | 34,433 | 202,045 | 236,478 | 307,421 | 148,663 | 213,475 | 669,559 | 906,037 |
| Hawaii | 5 | 0 | 4,000 ${ }^{\prime \prime}$ | 4,000 | 11,192 | 15,192 | 19,749 | 4,295 | 418,054 | 442,098 | 457,290 |
| Idaho | 4 | 901 | 5,832 ${ }^{\prime \prime}$ | 6,733 | 59,975 | 66,708 | 86,720 | 21,267 | 355,791 | 463,779 | 530,487 |
| Illinois | 2 | -99,936 | 77,587 ${ }^{\prime \prime}$ | -22,349 | 659,787 | 637,438 | 828,670 | 249,643 | 160,106 | 1,238,418 | 1,875,856 |
| Indiana | 2 | 989 | 52,426 ${ }^{\prime \prime}$ | 53,415 | 398,171 | 451,586 | 587,062 | 235,047 | 53,369 | 875,478 | 1,327,064 |
| lowa | 2 | 0 | 34,177 ${ }^{\prime \prime}$ | 34,177 | 787,969 | 822,147 | 1,068,791 | 82,278 | -35,579 | 1,115,489 | 1,937,636 |
| Kansas | 2 | 193,271 | 113,196 ${ }^{\prime \prime}$ | 306,466 | 214,568 | 521,035 | 677,345 | 62,683 | 338,001 | 1,078,030 | 1,599,064 |
| Kentucky | 2 | 25,603 | 11,753 | 37,356 | 180,266 | 217,623 | 282,909 | 89,028 | 275,738 | 647,676 | 865,298 |
| Louisiana | 3 | 770,349 | 47,001 ${ }^{\prime \prime}$ | 817,350 | 47,052 | 864,402 | 1,123,723 | 113,328 | 142,316 | 1,379,368 | 2,243,770 |
| Maine | 1-A | 0 | 14,364 | 14,364 | 73,874 | 88,238 | 114,710 | 14,519 | 569,266 | 698,494 | 786,732 |
| Maryland | 1-B | 0 | 10,735 ${ }^{\prime \prime}$ | 10,735 | 148,889 | 159,625 | 207,512 | 55,989 | 578,160 | 841,662 | 1,001,287 |
| Massachusetts | 1-A | 0 | 12,084 | 12,084 | 78,792 | 90,876 | 118,139 | 122,617 | 480,318 | 721,073 | 811,949 |
| Michigan | 2 | 9,920 | 53,073 | 62,993 | 989,576 | 1,052,569 | 1,368,340 | 235,635 | 676,003 | 2,279,978 | 3,332,547 |
| Minnesota | 2 | 0 | 48,010 ${ }^{\prime}$ | 48,010 | 850,496 | 898,506 | 1,168,057 | 121,225 | 551,476 | 1,840,758 | 2,739,264 |
| Mississippi | 3 | 103,161 | 15,478 | 118,638 | 112,451 | 231,089 | 300,416 | 42,497 | 418,054 | 760,967 | 992,056 |
| Missouri | 2 | 53 | 40,649 | 40,702 | 491,690 | 532,392 | 692,109 | 93,788 | 853,898 | 1,639,796 | 2,172,188 |
| Montana | 4 | 22,872 | 9,939 | 32,811 | 95,540 | 128,351 | 166,857 | 7,087 | 213,475 | 387,418 | 515,769 |
| Nebraska | 2 | 1,208 | 90,401 ${ }^{\text {² }}$ | 91,609 | 184,953 | 276,562 | 359,531 | 32,508 | 302,422 | 694,461 | 971,024 |
| Nevada | 5 | 150 | 4,172 ${ }^{\prime}$ | 4,322 | 18,031 | 22,353 | 29,059 | 18,667 | 195,685 | 243,411 | 265,765 |
| New Hampshire | 1-A | 0 | 16,118 | 16,118 | 101,655 | 117,773 | 153,104 | 22,680 | 151,211 | 326,996 | 444,768 |
| New Jersey | 1-B | 16,951 | 10,161 ${ }^{\text {² }}$ | 27,112 | 99,821 | 126,933 | 165,013 | 121,337 | 124,527 | 410,877 | 537,810 |
| New Mexico | 3 | 627,624 | 25,232 ${ }^{\prime \prime}$ | 652,856 | 83,554 | 736,410 | 957,333 | 9,324 | 231,264 | 1,197,921 | 1,934,331 |
| New York | 1-B | 130 | 36,262 ${ }^{\prime}$ | 36,392 | 537,067 | 573,459 | 745,497 | 171,703 | 400,265 | 1,317,464 | 1,890,923 |
| North Carolina | 1-C | 0 | 48,699 ${ }^{\prime \prime}$ | 48,699 | 382,266 | 430,964 | 560,254 | 238,509 | 124,527 | 923,290 | 1,354,254 |
| North Dakota | 2 | 938,724 | 35,079 ${ }^{\prime \prime}$ | 973,803 | 206,364 | 1,180,167 | 1,534,217 | 9,305 | 195,685 | 1,739,207 | 2,919,373 |
| Ohio | 2 | 362,594 | 117,177 ${ }^{\prime \prime}$ | 479,771 | 534,828 | 1,014,599 | 1,318,979 | 258,411 | 684,898 | 2,262,288 | 3,276,887 |
| Oklahoma | 2 | 1,412,760 | 150,328 ${ }^{\prime \prime}$ | 1,563,088 | 236,240 | 1,799,328 | 2,339,126 | 44,037 | 222,369 | 2,605,533 | 4,404,861 |
| Oregon | 5 | 0 | 8,020 | 8,020 | 32,158 | 40,178 | 52,231 | 80,127 | 587,055 | 719,413 | 759,592 |
| Pennsylvania | 1-B | 358,226 | 70,400 | 428,625 | 460,007 | 888,632 | 1,155,222 | 215,848 | 257,948 | 1,629,018 | 2,517,650 |
| Rhode Island | 1-A | 0 | 2,839 ${ }^{\prime \prime}$ | 2,839 | 16,546 | 19,385 | 25,200 | 12,229 | 604,845 | 642,274 | 661,659 |
| South Carolina | 1-C | 0 | 23,845 | 23,845 | 99,326 | 123,171 | 160,122 | 89,168 | 382,475 | 631,765 | 754,936 |
| South Dakota | 2 | 748 | 7,227 | 7,975 | 142,504 | 150,478 | 195,622 | 12,236 | 231,264 | 439,122 | 589,600 |
| Tennessee | 2 | 1,266 | 11,484 | 12,749 | 201,093 | 213,843 | 277,995 | 128,949 | 382,475 | 789,420 | 1,003,262 |
| Texas | 3 | 6,356,021 | 221,290 ${ }^{\prime \prime}$ | 6,577,310 | 376,838 | 6,954,148 | 9,040,393 | 530,567 | 480,318 | 10,051,278 | 17,005,426 |
| Utah | 4 | 100,050 | 12,946 ${ }^{\prime}$ | 112,997 | 48,806 | 161,802 | 210,343 | 44,191 | 400,265 | 654,799 | 816,601 |
| Vermont | 1-A | 0 | 10,330 ${ }^{\prime \prime}$ | 10,330 | 67,654 | 77,983 | 101,378 | 7,352 | 435,844 | 544,574 | 622,558 |
| Virginia | 1-C | 3 | 21,712 ${ }^{\prime}$ | 21,715 | 246,126 | 267,841 | 348,193 | 109,949 | 524,792 | 982,934 | 1,250,775 |
| Washington | 5 | 0 | 19,227 ${ }^{\prime \prime}$ | 19,227 | 80,079 | 99,306 | 129,098 | 145,344 | 498,107 | 772,549 | 871,855 |
| West Virginia | 1-C | 984,883 | 80,595 | 1,065,477 | 42,053 | 1,107,530 | 1,439,790 | 18,279 | 284,633 | 1,742,701 | 2,850,232 |
| Wisconsin | 2 | 0 | 35,141 ${ }^{\prime \prime}$ | 35,141 | 694,988 | 730,130 | 949,168 | 145,757 | 329,107 | 1,424,032 | 2,154,161 |
| Wyoming | 4 | 53,129 | 10,658 ${ }^{\prime \prime}$ | 63,787 | 52,131 | 115,918 | 150,693 | 0 | 266,843 | 417,536 | 533,454 |
| Total Allocated to states |  | 13,684,552 | 1,858,062 | 15,542,614 | 11,304,778 | 26,847,392 | 34,901,610 | 5,369,478 | 16,108,435 | 56,379,523 | 83,226,915 |
| Values Not Applied to States |  |  |  |  |  |  |  |  |  |  |  |
| Value of Imported N | roduct | 1,570,242 |  |  |  |  |  |  |  |  |  |
| Value in Imported C |  | 1,723,758 |  |  |  |  |  |  |  |  |  |
| Value in Foreign Nat | Gas | 180,989 |  |  |  |  |  |  |  |  |  |
| Storage Inventory C |  | -25,743 |  | Value in Non-U.S. Consumption $\searrow$ |  |  |  |  |  |  |  |
| Import Adjustments |  | -856,428 |  | -8,494,811 |  |  |  |  |  |  |  |
| U.S. Total |  | 16,277,370 | 1,858,062 | 18,135,432 | 11,304,778 | 20,945,399 | 20,945,399 | 4,189,080 | 12,567,239 | 37,701,718 | 58,647,117 |

Impact of the U.S. Consumer Propane Industry on U.S. and State Economies in 2018

Table 13: State Level Value Summary for Total NGLs / LRGs, 2018

|  |  |  |  |  |  | Value Added | $(\$ 1,000)$ |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| State | $\begin{aligned} & \text { SUB } \\ & \text { PAD } \end{aligned}$ | Supply | Transportation, Storage, and Wholesaling Markup | Wholesale Value | Retail Markup | Direct <br> Value <br> Added | $\qquad$ | Indirect <br> Manuacturing Allocation Contribution | \& Induced <br> CDDP <br> Allocation Contribution | Contribution to GDP | Total <br> Contribution To GDP |
| Alabama | 3 | 161,674 | 34,824 | 196,499 | 107,726 | 304,225 | 395,492 | 209,123 | -765,798 | -161,182 | 143,042 |
| Alaska | 5 | 866,179 | 17,039 | 883,218 | 5,291 | 888,509 | 1,155,061 | 9,456 | 531,804 | 1,696,322 | 2,584,830 |
| Arizona | 5 | 13 | 8,828 | 8,841 | 42,723 | 51,564 | 67,033 | 164,429 | 467,987 | 699,449 | 751,013 |
| Arkansas | 3 | 9,444 | 74,275 | 83,719 | 90,456 | 174,175 | 226,428 | 109,282 | -148,905 | 186,805 | 360,980 |
| California | 5 | 503,322 | 223,992 | 727,314 | 227,180 | 954,494 | 1,240,842 | 1,744,147 | 680,709 | 3,665,698 | 4,620,192 |
| Colorado | 4 | 3,168,196 | 852,197 | 4,020,393 | 219,416 | 4,239,809 | 5,511,752 | 138,465 | 850,886 | 6,501,103 | 10,740,912 |
| Connecticut | 1-A | 0 | 11,629 | 11,629 | 82,279 | 93,908 | 122,081 | 169,477 | 829,614 | 1,121,172 | 1,215,080 |
| Delaware | 1-B | 17,153 | 6,308 | 23,461 | 65,099 | 88,559 | 115,127 | 25,896 | 170,177 | 311,201 | 399,761 |
| District of Columbia | 1-B | 0 | 344 | 344 | 5,025 | 5,369 | 6,980 | 0 | 297,810 | 304,790 | 310,160 |
| Florida | 1-C | 5,112 | 18,915 | 24,027 | 181,760 | 205,787 | 267,522 | 307,725 | 787,070 | 1,362,318 | 1,568,104 |
| Georgia | 1-C | 0 | 37,831 | 37,831 | 202,045 | 239,875 | 311,838 | 355,532 | 510,532 | 1,177,902 | 1,417,777 |
| Hawaii | 5 | 0 | 4,166 | 4,166 | 11,192 | 15,358 | 19,965 | 10,271 | 999,791 | 1,030,027 | 1,045,384 |
| Idaho | 4 | 2,675 | 5,889 | 8,564 | 59,975 | 68,539 | 89,101 | 50,862 | 850,886 | 990,849 | 1,059,388 |
| Illinois | 2 | 534,294 | 438,360 | 972,654 | 673,924 | 1,646,578 | 2,140,551 | 597,029 | 382,899 | 3,120,479 | 4,767,057 |
| Indiana | 2 | 2,034 | 160,676 | 162,710 | 398,920 | 561,630 | 730,120 | 562,123 | 127,633 | 1,419,875 | 1,981,506 |
| lowa | 2 | 0 | 128,104 | 128,104 | 789,702 | 917,806 | 1,193,148 | 196,771 | -85,089 | 1,304,830 | 2,222,637 |
| Kansas | 2 | 539,395 | 1,109,199 | 1,648,594 | 312,711 | 1,961,306 | 2,549,697 | 149,909 | 808,342 | 3,507,948 | 5,469,254 |
| Kentucky | 2 | 71,286 | 72,322 | 143,608 | 189,776 | 333,384 | 433,399 | 212,914 | 659,437 | 1,305,749 | 1,639,133 |
| Louisiana | 3 | 2,165,483 | 637,910 | 2,803,393 | 115,046 | 2,918,439 | 3,793,971 | 271,029 | 340,354 | 4,405,354 | 7,323,793 |
| Maine | 1-A | 0 | 14,364 | 14,364 | 73,874 | 88,238 | 114,710 | 34,723 | 1,361,418 | 1,510,851 | 1,599,089 |
| Maryland | 1-B | 0 | 10,735 | 10,735 | 148,889 | 159,625 | 207,512 | 133,899 | 1,382,690 | 1,724,102 | 1,883,727 |
| Massachusetts | 1-A | 0 | 12,084 | 12,084 | 78,792 | 90,876 | 118,139 | 293,243 | 1,148,696 | 1,560,078 | 1,650,954 |
| Michigan | 2 | 25,264 | 67,637 | 92,901 | 990,603 | 1,083,504 | 1,408,555 | 563,530 | 1,616,684 | 3,588,769 | 4,672,273 |
| Minnesota | 2 | 0 | 55,352 | 55,352 | 850,496 | 905,848 | 1,177,603 | 289,914 | 1,318,873 | 2,786,390 | 3,692,238 |
| Mississippi | 3 | 287,114 | 82,839 | 369,954 | 119,552 | 489,505 | 636,357 | 101,633 | 999,791 | 1,737,781 | 2,227,286 |
| Missouri | 2 | 109 | 96,471 | 96,579 | 492,669 | 589,248 | 766,022 | 224,298 | 2,042,127 | 3,032,447 | 3,621,695 |
| Montana | 4 | 57,264 | 10,639 | 67,903 | 95,540 | 163,443 | 212,476 | 16,948 | 510,532 | 739,957 | 903,400 |
| Nebraska | 2 | 2,484 | 350,607 | 353,091 | 184,953 | 538,044 | 699,457 | 77,744 | 723,253 | 1,500,454 | 2,038,498 |
| Nevada | 5 | 308 | 4,178 | 4,486 | 18,031 | 22,517 | 29,272 | 44,643 | 467,987 | 541,902 | 564,419 |
| New Hampshire | 1-A | 0 | 16,118 | 16,118 | 101,655 | 117,773 | 153,104 | 54,240 | 361,627 | 568,971 | 686,744 |
| New Jersey | 1-B | 39,922 | 116,461 | 156,383 | 114,561 | 270,944 | 352,227 | 290,182 | 297,810 | 940,219 | 1,211,163 |
| New Mexico | 3 | 1,766,711 | 149,114 | 1,915,826 | 84,696 | 2,000,522 | 2,600,679 | 22,299 | 553,076 | 3,176,053 | 5,176,575 |
| New York | 1-B | 267 | 36,262 | 36,529 | 537,067 | 573,596 | 745,675 | 410,633 | 957,247 | 2,113,555 | 2,687,151 |
| North Carolina | 1-C | 0 | 51,896 ${ }^{\prime}$ | 51,896 | 382,266 | 434,162 | 564,411 | 570,403 | 297,810 | 1,432,624 | 1,866,786 |
| North Dakota | 2 | 2,416,026 | 91,918 ${ }^{\prime \prime}$ | 2,507,944 | 206,364 | 2,714,308 | 3,528,601 | 22,254 | 467,987 | 4,018,842 | 6,733,150 |
| Ohio | 2 | 1,032,516 | 454,817 ${ }^{\prime \prime}$ | 1,487,333 | 541,846 | 2,029,179 | 2,637,933 | 617,998 | 1,637,956 | 4,893,887 | 6,923,066 |
| Oklahoma | 2 | 3,846,444 | 712,333 ${ }^{\prime \prime}$ | 4,558,777 | 263,668 | 4,822,445 | 6,269,179 | 105,316 | 531,804 | 6,906,298 | 11,728,743 |
| Oregon | 5 | 0 | 8,020 | 8,020 | 32,158 | 40,178 | 52,231 | 191,626 | 1,403,962 | 1,647,820 | 1,687,998 |
| Pennsylvania | 1-B | 926,098 | 802,699 ${ }^{\prime \prime}$ | 1,728,797 | 838,463 | 2,567,260 | 3,337,438 | 516,207 | 616,892 | 4,470,538 | 7,037,798 |
| Rhode Island | 1-A | 0 | 2,839 ${ }^{\prime \prime}$ | 2,839 | 16,546 | 19,385 | 25,200 | 29,246 | 1,446,506 | 1,500,953 | 1,520,338 |
| South Carolina | 1-C | 0 | 27,043 ${ }^{\prime \prime}$ | 27,043 | 99,326 | 126,369 | 164,279 | 213,247 | 914,703 | 1,292,229 | 1,418,598 |
| South Dakota | 2 | 1,538 | 7,227 ${ }^{\prime \prime}$ | 8,764 | 142,504 | 151,268 | 196,649 | 29,262 | 553,076 | 778,987 | 930,255 |
| Tennessee | 2 | 3,427 | 11,853 | 15,280 | 201,093 | 216,373 | 281,285 | 308,386 | 914,703 | 1,504,374 | 1,720,747 |
| Texas | 3 | 17,840,549 | 4,593,922 | 22,434,472 | 877,182 | 23,311,653 | 30,305,149 | 1,268,870 | 1,148,696 | 32,722,715 | 56,034,368 |
| Utah | 4 | 282,558 | 369,301 ${ }^{\prime \prime}$ | 651,859 | 68,697 | 720,556 | 936,723 | 105,684 | 957,247 | 1,999,654 | 2,720,211 |
| Vermont | 1-A | 0 | 10,330 | 10,330 | 67,654 | 77,983 | 101,378 | 17,582 | 1,042,335 | 1,161,296 | 1,239,280 |
| Virginia | 1-C | 6 | 21,712 ${ }^{\prime \prime}$ | 21,718 | 246,126 | 267,844 | 348,197 | 262,947 | 1,255,057 | 1,866,202 | 2,134,046 |
| Washington | 5 | 0 | 58,957 ${ }^{\prime \prime}$ | 58,957 | 83,531 | 142,489 | 185,235 | 347,594 | 1,191,241 | 1,724,070 | 1,866,558 |
| West Virginia | 1-C | 2,614,439 | 161,729 ${ }^{\prime}$ | 2,776,168 | 42,053 | 2,818,221 | 3,663,687 | 43,715 | 680,709 | 4,388,111 | 7,206,331 |
| Wisconsin | 2 | 0 | 35,132 | 35,132 | 694,988 | 730,120 | 949,156 | 348,583 | 787,070 | 2,084,808 | 2,814,928 |
| Wyoming | 4 | 110,708 | 84,750 | 195,458 | 58,199 | 253,657 | 329,754 | 0 | 638,165 | 967,918 | 1,221,575 |
| Total Allocated to states |  | 39,300,013 | 12,372,150 | 51,672,163 | 12,534,285 | 64,206,448 | 83,468,383 | 12,841,290 | 38,523,869 | 134,833,542 | 199,039,990 |
| Values Not Applied to States |  |  |  |  |  |  |  |  |  |  |  |
| Value of Imported NG | roduct | 2,420,451 |  |  |  |  |  |  |  |  |  |
| Value in Imported Cr |  | 3,544,266 |  |  |  |  |  |  |  |  |  |
| Value in Foreign Natur | Gas | 610,727 |  |  |  |  |  |  |  |  |  |
| Storage Inventory Ch |  | -29,230 |  | Value in Non-U.S. Consumption $\searrow$ |  |  |  |  |  |  |  |
| Import Adjustments |  | -933,020 |  | -16,217,549 |  |  |  |  |  |  |  |
| U.S. Total |  | 44,913,207 | 12,372,150 | 57,285,358 | 12,534,285 | 53,602,094 | 53,602,094 | 10,720,419 | 32,161,257 | 96,483,770 | 150,085,864 |

### 4.2. Summary Results of the Propane Value Chain Analysis

The basic results of the ICF analysis are shown in a series of value-chain and volume-chain diagrams. The detailed results, including volumes, value and prices for each step in the value chain are shown in Figure 8 through Figure 17.

## Explanation of Value/Volume Chain Diagrams

Each of the ten value/volume chain diagrams illustrates the flow of values or volumes for one of the product categories considered: (Odorized Propane, Propane, Propane/Propylene, Ethane, and Total NGLs/LRGs). These diagrams depict the total product supply process, from the wellhead to the burner tip. They are organized horizontally by supply source, with crude oil and refining at the left, natural gas and natural gas processing and fractionation in the center, and imports and inventory changes at the right. Vertically, the diagrams start upstream, indicating the value/volume of inputs. Thus, the top left box contains the value/volume in domestically-produced crude converted to product shown.

The diagrams split out the contribution to the value/volume chain from Canadian resources. Thus, the second box down shows the value in Canadian crude/"wet" natural gas imported into the U.S. and converted to the product shown in the diagram, and the box below sums up domestic and Canadian inputs into a North America total. The fourth box down then adds in non-North American crude to sum up to total value/volume of crude converted to product. LNG imports from outside North America are not processed for NGL extraction.

The column on the right shows the import/export balance. The top box shows the total value/ volume of product exported from the United States. The second box in the Product Imports/ Exports column shows the value/volume of product imports from Canada. Third box down shows the total imports from outside North America, with the box below netting out imports and exports to arrive at the total net imports of product into the U.S.

Net inventory changes for the year, calculated as the difference in inventory levels between January $1^{\text {st }}$ and December $31^{\text {st }}$ of 2018, are not shown. Positive numbers indicate net storage withdrawals, which add to total supply, and therefore to total value/volume contributed to the economy in that year.

The processing, or midstream, section of the diagram shows value added in the refining, natural gas processing, and fractionating stages of NGL/LRG production (the volume chain diagrams do not show Processing and Market Services sector contributions, as these do not add to volume). For refining, this value represents the difference between the Refiner Acquisition Cost of Crude (RACC) and the wholesale value of product on a $\$ / \mathrm{MMBtu}$ basis. A negative number indicates a discount, on a Btu basis, of product to crude price for the year. The processing and fractionation value is the total value added by the natural gas processing industry in the processing of both domestic and Canadian gas (at the Aux Sable plant in Illinois).

Below the processing sector is the market services section, which adds in the value of wholesaling services and retail markup. For wholesaling services, the total is the difference between the supply and wholesale pricing points. Retail services are the final component of the value chain, and represent the difference between the wholesale value of the product and the total retail value at the ultimate point of consumption.

Both the value chain analysis diagram and the volume chain diagram to its right show at bottom the share of domestic and North American value/volume contribution to the total product consumption in the United States.

Impact of the U.S. Consumer Propane Industry on U.S. and State Economies in 2018

Figure 8: Value Chain for Odorized Propane ( $\mathrm{C}_{3} \mathrm{H}_{8}$ ), 2018 (Million Dollars)


Total Retail Value

| Domestic Contribution to Value: | $\mathbf{9 3 \%}$ |
| ---: | :--- |
| North American Contribution to Value: | $\mathbf{9 7 \%}$ |

Impact of the U.S. Consumer Propane Industry on U.S. and State Economies in 2018

Figure 9: Volume Chain for Odorized Propane ( $\mathrm{C}_{3} \mathrm{H}_{8}$ ), 2018 (Thousand Gallons)


* No non-North American natural gas is processed into product

Total Retail Value

| Domestic Contribution to Supply: | $82 \%$ |
| ---: | :--- |
| North American Contribution to Supply: | $\mathbf{9 4 \%}$ |

Impact of the U.S. Consumer Propane Industry on U.S. and State Economies in 2018

Figure 10: Value Chain for All Purity Propane ( $\mathrm{C}_{3} \mathrm{H}_{8}$ ), 2018 (Million Dollars)


## Total Retail Value

| Domestic Contribution to Value: | $116 \%$ |
| ---: | :---: |
| North American Contribution to Value: | $94 \%$ |

Impact of the U.S. Consumer Propane Industry on U.S. and State Economies in 2018

Figure 11: Volume Chain for All Purity Propane $\left(\mathrm{C}_{3} \mathrm{H}_{8}\right), 2018$ (Thousand Gallons)


* No non-North American natural gas is processed into product

Total Retail Value

| Domestic Contribution to Supply: | $82 \%$ |
| ---: | :--- |
| North American Contribution to Supply: | $\mathbf{9 4 \%}$ |

Impact of the U.S. Consumer Propane Industry on U.S. and State Economies in 2018

Figure 12: Value Chain for Butanes $\left(\mathrm{C}_{4} \mathrm{H}_{10}\right)$, 2018 (Million Dollars)


* No non-North American natural gas is processed into product


## Total Retail Value

| Domestic Contribution to Value: | $105 \%$ |
| :---: | :---: |
| North American Contribution to Value: | $96 \%$ |

Impact of the U.S. Consumer Propane Industry on U.S. and State Economies in 2018

Figure 13: Volume Chain for Butanes $\left(\mathrm{C}_{4} \mathrm{H}_{10}\right), 2018$ (Thousand Gallons)


* No non-North American natural gas is processed into product

Total Retail Value

| Domestic Contribution to Supply: | $89 \%$ |
| ---: | :--- |
| North American Contribution to Supply: | $95 \%$ |

Impact of the U.S. Consumer Propane Industry on U.S. and State Economies in 2018

Figure 14: Value Chain for Ethane $\left(\mathrm{C}_{2} \mathrm{H}_{6}\right), 2018$ (Million Dollars)


Total Retail Value

| Domestic Contribution to Value: | $95 \%$ |
| :---: | :---: |
| North American Contribution to Value: | $104 \%$ |

Impact of the U.S. Consumer Propane Industry on U.S. and State Economies in 2018

Figure 15: Volume Chain for Ethane $\left(\mathrm{C}_{2} \mathrm{H}_{6}\right), 2018$ (Thousand Gallons)


* No non-North American natural gas is processed into product

Total Retail Value

| Domestic Contribution to Supply: | $92 \%$ |
| :---: | :---: |
| North American Contribution to Supply: | $100 \%$ |

Figure 16: Value Chain for All NGLs and LRGs, 2018 (Million Dollars)


* No non-North American natural gas is processed into product

Total Retail Value

| Domestic Contribution to Value: | $113 \%$ |
| ---: | :--- |
| North American Contribution to Value: | $120 \%$ |

Impact of the U.S. Consumer Propane Industry on U.S. and State Economies in 2018

Figure 17: Volume Chain for All NGLs and LRGs, 2018 (Thousand Gallons)


* No non-North American natural gas is processed into product

Total Retail Value

| Domestic Contribution to Supply: | $\mathbf{8 6 \%}$ |
| ---: | :--- |
| North American Contribution to Supply: | $\mathbf{9 5 \%}$ |

Impact of the U.S. Consumer Propane Industry on U.S. and State Economies in 2018

Table 14: National Value Summary for Odorized Propane ( $\mathrm{C}_{3} \mathrm{H}_{8}$ ), 2018

|  | Volume | Value | Price |
| :---: | :---: | :---: | :---: |
|  | Gallons (1,000) | \$ Million | \$ per Gal. |
| Refining |  |  |  |
| Value in Imported Crude (CIF) | 756,656 | 625.0 | 0.826 |
| in Canadian Crude | 301,499 | 249.0 | 0.826 |
| in Non-Canadian crude | 455,157 | 376.0 | 0.826 |
| Value in Domestic Crude | 906,931 | 725.5 | 0.800 |
| Value Added by Crude Refining | 1,663,587 | $450.4{ }^{\text {² }}$ | 0.271 |
| Refinery Sales | 1,663,587 | 1,800.9 | 1.083 |
| Gas Processing |  |  |  |
| Value in Natural Gas | 6,213,654 | 1,321.5 | 0.213 |
| Value Added by Gas Processing | 6,213,654 | 1,296.9 | 0.209 |
| Fractionation | 6,213,654 | 287.9 | 0.046 |
| Gas Plants (With Fractionation) | 6,213,654 | 2,906.3 | 0.468 |
| EIA Product Imports |  |  |  |
| Imported Product Value (CIF) | 630,348 | 458.1 | 0.727 |
| Canadian Imports | 582,164 | 423.1 | 0.727 |
| Non-Canadian Imports | 48,185 | 35.0 | 0.727 |
| Terminaling | 630,348 | 11.7 | 0.019 |
| Imports (With Terminaling) | 630,348 | 469.8 | 0.745 |
| Inventory Change | $(152,066)$ | (68.9) | 0.453 |
| Supply | 8,355,523 | 5,108.1 | 0.611 |
| Import Adjust. (Imports Not Counted by EIA) | $(130,480)$ | (87.3) | 0.669 |
| Aux Sable Value Added by Gas Processing and Frac. | 225,760 | 110.0 | 0.487 |
| Aux Sable Value of Canadian Gas | 225,760 | 47.9 | 0.212 |
| Total Supply | 8,450,804 | 5,178.7 | 0.613 |
| Exports |  |  |  |
| Export Product Value | - | - |  |
| Terminaling | - | - |  |
| Export Value (FOB) | - | - |  |
| Domestic Demand | 8,450,804 | 6,096.1 | 0.721 |
| Balancing Item | - | - | 0.721 |
| Total Domestic Demand (Wholesale Value) | 8,450,804 | 6,096.1 | 0.721 |
| Supply Value | 8,450,804 | 5,178.7 | 0.613 |
| Wholesale Value | 8,450,804 | 6,096.1 | 0.721 |
| Wholesale Market Services | 8,450,804 | 917.4 | 0.109 |
| Breakout of Wholesale Market Services |  |  |  |
| Long Distance P/L Transportation |  | 135.5 |  |
| Intra PAD P/L Transporation |  | 139.2 |  |
| Storage and Wholesale Markup |  | 642.7 |  |
| Wholesale Value Balancing Item |  | - |  |
| Total Wholesale Market Services | 8,450,804 | 917.4 | 0.109 |
| Final Retail Values |  |  |  |
| Wholesale Value | 8,450,804 | 6,096.1 | 0.721 |
| Retail Markup on Total Volume | 8,450,804 | 9,550.3 | 1.130 |
| Total Retail Value | 8,450,804 | 15,646.4 | 1.851 |

Impact of the U.S. Consumer Propane Industry on U.S. and State Economies in 2018

Table 15: National Value Summary for All Purity Propane ( $\mathrm{C}_{3} \mathrm{H}_{8}$ ), 2018

|  | Volume | Value | Price |
| :---: | :---: | :---: | :---: |
|  | Gallons (1,000) | \$ Million | \$ per Gal. |
| Refining |  |  |  |
| Value in Imported Crude (CIF) | 2,135,967 | 1,764.3 | 0.826 |
| in Canadian Crude | 851,101 | 703.0 | 0.826 |
| in Non-Canadian crude | 1,284,865 | 1,061.3 | 0.826 |
| Value in Domestic Crude | 2,560,179 | 2,048.0 | 0.800 |
| Value Added by Crude Refining | 4,696,146 | 1,271.5 | 0.271 |
| Refinery Sales | 4,696,146 | 5,083.8 | 1.083 |
| Gas Processing |  |  |  |
| Value in Natural Gas | 17,540,544 | 3,730.5 | 0.213 |
| Value Added by Gas Processing | 17,540,544 | 3,661.0 | 0.209 |
| Fractionation | 17,540,544 | 812.8 | 0.046 |
| Gas Plants (With Fractionation) | 17,540,544 | 8,204.3 | 0.468 |
| EIA Product Imports |  |  |  |
| Imported Product Value (CIF) | 1,779,413 | 1,293.1 | 0.727 |
| Canadian Imports | 1,643,392 | 1,194.3 | 0.727 |
| Non-Canadian Imports | 136,021 | 98.8 | 0.727 |
| Terminaling | 1,779,413 | 33.0 | 0.019 |
| Imports (With Terminaling) | 1,779,413 | 1,326.2 | 0.745 |
| Inventory Change | $(429,267)$ | (194.5) | 0.453 |
| Supply | 23,586,836 | 14,419.7 | 0.611 |
| Import Adjust. (Imports Not Counted by EIA) | $(368,332)$ | (246.6) | 0.669 |
| Aux Sable Value Added by Gas Processing and Frac. | 637,300 | 310.5 | 0.487 |
| Aux Sable Value of Canadian Gas | 637,300 | 135.3 | 0.212 |
| Total Supply | 23,855,804 | 14,618.9 | 0.613 |
| Exports |  |  |  |
| Export Product Value | 9,304,405 | 6,183.5 | 0.665 |
| Terminaling | 9,304,405 | 345.9 | 0.037 |
| Export Value (FOB) | 9,304,405 | 6,529.4 | 0.702 |
| Domestic Demand | 10,979,771 | 7,920.4 | 0.721 |
| Balancing Item | 3,571,628 | 2,576.4 | 0.721 |
| Total Domestic Demand (Wholesale Value) | 14,551,399 | 10,496.9 | 0.721 |
| Supply Value | 14,551,399 | 8,917.1 | 0.613 |
| Wholesale Value | 14,551,399 | 10,496.9 | 0.721 |
| Wholesale Market Services | 14,551,399 | 1,579.7 | 0.109 |
| Breakout of Wholesale Market Services |  |  |  |
| Long Distance P/L Transportation |  | 382.4 |  |
| Intra PAD P/L Transporation |  | 393.1 |  |
| Storage and Wholesale Markup |  | 804.3 |  |
| Wholesale Value Balancing Item |  | 135.8 |  |
| Total Wholesale Market Services | 14,551,399 | 1,715.6 | 0.118 |
| Final Retail Values |  |  |  |
| Wholesale Value | 14,551,399 | 10,496.9 | 0.721 |
| Retail Markup on Total Volume | 14,551,399 | 9,550.3 | 0.656 |
| Total Retail Value | 14,551,399 | 20,047.2 | 1.378 |

Impact of the U.S. Consumer Propane Industry on U.S. and State Economies in 2018

Table 16: National Value Summary for Butanes ( $\mathrm{C}_{4} \mathrm{H}_{10}$ ), 2018

## Refining

| Value in Imported Crude (CIF) | 421,585 | 328 | 0.778 |
| :---: | :---: | :---: | :---: |
| in Canadian Crude | 167,985 | 131 | 0.778 |
| in Non-Canadian crude | 253,599 | 197 | 0.778 |
| Value in Domestic Crude | 505,313 | 381 | 0.753 |
| Value Added by Crude Refining | 926,898 | 417 | 0.450 |
| Refinery Sales | 926,898 | 1,125.1 | 1.214 |
| Gas Processing |  |  |  |
| Value in Natural Gas | 9,726,360 | 2,236 | 0.230 |
| Value Added by Gas Processing | 9,726,360 | 3,281 | 0.337 |
| Fractionation | 9,726,360 | 458 | 0.047 |
| Gas Plants (With Fractionation) | 9,726,360 | 5,974.6 | 0.614 |
| EIA Product Imports |  |  |  |
| Imported Product Value (CIF) | 573,472 | 644 | 1.123 |
| Canadian Imports | 257,761 | 301 | 1.170 |
| Non-Canadian Imports | 315,710 | 342 | 1.084 |
| Terminaling | 573,472 | 13 | 0.023 |
| Imports (With Terminaling) | 573,472 | 656.8 | 1.145 |
| Inventory Change | $(135,828)$ | (81) | 0.596 |
| Supply | 11,090,902 | 7,675.6 | 0.692 |
| Import Adjust. (Imports Not Counted by EIA) | - | - | - |
| Aux Sable Value Added by Gas Processing and Frac. | 278,271 | 265 | 0.951 |
| Aux Sable Value of Canadian Gas | 278,271 | 64 | 0.229 |
| Total Supply | 11,369,173 | 8,003.8 | 0.704 |
| Exports |  |  |  |
| Export Product Value | 1,592,894 | 1,593 | 1.000 |
| Terminaling | 1,592,894 | 57 | 0.036 |
| Export Value (FOB) | 1,592,894 | 1,649.7 | 1.036 |
| Domestic Demand | 9,721,362 | 11,436 | 1.176 |
| Balancing Item | 54,917 | 64.6 | 1.176 |
| Total Domestic Demand (Wholesale Value) | 9,776,279 | 11,500.4 | 1.176 |
| Supply Value | 9,776,279 | 6,882.4 | 0.704 |
| Wholesale Value | 9,776,279 | 11,500.4 | 1.176 |
| Wholesale Market Services | 9,776,279 | 4,618.0 | 0.472 |
| Breakout of Wholesale Market Services |  |  |  |
| Long Distance P/L Transportation |  | 496.6 |  |
| Intra PAD P/L Transporation |  | 185.8 |  |
| Storage and Wholesale Markup |  | 3,965.5 |  |
| Wholesale Value Balancing Item |  | 376.4 |  |
| Total Wholesale Market Services | 9,776,279 | 5,024.4 | 0.514 |
| Final Retail Values |  |  |  |
| Wholesale Value | 9,776,279 | 11,500.4 | 1.176 |
| Retail Markup on Total Volume | 9,776,279 | 1,234.9 | 0.126 |
| Total Retail Value | 9,776,279 | 12,735.3 | 1.303 |
| Retail Margin |  |  |  |
| Non-Chemical Retail Value | 583,282 | 1,368 | 2.345 |
| Non-Chemical Wholesale Value | 583,282 | 683 | 1.171 |
| Difference $=$ Retail Markup | 583,282 | 685.1 | 1.175 |

Impact of the U.S. Consumer Propane Industry on U.S. and State Economies in 2018

Table 17: National Value Summary for Ethane $\left(\mathrm{C}_{2} \mathrm{H}_{6}\right), 2018$

|  | Volume | Value | Price |
| :---: | :---: | :---: | :---: |
|  | Gallons (1,000) | \$ Million | \$ per Gal. |
| Refining |  |  |  |
| Value in Imported Crude (CIF) | 38,932 | 26.8 | 0.687 |
| in Canadian Crude | 15,513 | 10.7 | 0.687 |
| in Non-Canadian Crude | 23,419 | 16.1 | 0.687 |
| Value in Domestic Crude | 46,664 | 31.1 | 0.666 |
| Value Added by Crude Refining | 85,596 | 6.4 | 0.075 |
| Refinery Sales | 85,596 | 64.2 | 0.751 |
| Gas Processing |  |  |  |
| Value in Natural Gas | 17,318,616 | 3,005.6 | 0.174 |
| Value Added by Gas Processing | 17,318,616 | (618.9) | (0.036) |
| Fractionation | 17,318,616 | 797.2 | 0.046 |
| Gas Plants (With Fractionation) | 17,318,616 | 3,183.9 | 0.184 |
| EIA Product Imports |  |  |  |
| Imported Product Value (CIF) | 1,512 | 0.4 | 0.263 |
| Canadian Imports | 1,512 | 0.4 | 0.263 |
| Non-Canadian Imports | - | - | - |
| Terminaling | 1,512 | 0.0 | 0.010 |
| Imports (With Terminaling) | 1,512 | 0.4 | 0.273 |
| Inventory Change | $(525,168)$ | (96.5) | 0.184 |
| Supply | 16,880,556 | 3,152.0 | 0.187 |
| Import Adjust. (Imports Not Counted by EIA) | - | - |  |
| Aux Sable Value Added by Gas Processing and Frac. | 1,401,087 | 143.6 | 0.103 |
| Aux Sable Value of Canadian Gas | 1,401,087 | 238.9 | 0.171 |
| Total Supply | 18,281,643 | 3,534.6 | 0.193 |
| Exports |  |  |  |
| Export Product Value | 991,998 | 238.8 | 0.241 |
| Terminaling | 991,998 | 32.1 | 0.032 |
| Export Value (FOB) | 991,998 | 270.9 | 0.273 |
| Domestic Demand | 17,318,616 | 4,728.9 | 0.273 |
| Balancing Item | -28,971 | (7.9) | 0.273 |
| Total Domestic Demand (Wholesale Value) | 17,289,645 | 4,721.0 | 0.273 |
| Supply Value | 17,289,645 | 3,342.8 | 0.193 |
| Wholesale Value | 17,289,645 | 4,721.0 | 0.273 |
| Wholesale Market Services | 17,289,645 | 1,378.2 | 0.080 |
| Breakout of Wholesale Market Services |  |  |  |
| Long Distance P/L Transportation |  | 274.2 |  |
| Intra PAD P/L Transporation |  | 319.7 |  |
| Storage and Wholesale Markup |  | 784.4 |  |
| Wholesale Value Balancing Item |  | 14.9 |  |
| Total Wholesale Market Services | 17,289,645 | 1,393.1 | 0.080 |
| Retail Margin |  |  |  |
| Non-Chemical Retail Value | 296,873 | 429.8 | 1.448 |
| Non-Chemical Wholesale Value | 296,873 | 81.1 | 0.273 |
| Difference $=$ Retail Markup on Non-Chem. | 296,873 | 348.7 | 1.175 |
| Final Retail Values |  |  |  |
| Wholesale Value | 17,289,645 | 4,721.0 | 0.273 |
| Retail Markup on Total Volume | 17,289,645 | 348.7 | 0.020 |
| Total Retail Value | 17,289,645 | 5,069.8 | 0.293 |

Impact of the U.S. Consumer Propane Industry on U.S. and State Economies in 2018

Table 18: National Value Summary for Total NGL and LRG, 2018

| Volume | Value | Price |
| :---: | :---: | :---: |
| Gallons $(1,000)$ | \$ Million | \$ per Gal. |

## Refining

| Value in Imported Crude (CIF) |  | 4,555,785 | 3,586.3 | 0.787 |
| :---: | :---: | :---: | :---: | :---: |
| in Canadian Crude |  | 1,815,307 | 1,429.0 | 0.787 |
| in Non-Canadian crude |  | 2,740,478 | 2,157.3 | 0.787 |
| Value in Domestic Crude |  | 5,460,585 | 4,162.9 | 0.762 |
| Value Added by Crude Refining | - | 10,016,370 | 2,861.0 | 0.286 |
| Refinery Sales |  | 10,016,370 | 10,610.2 | 1.059 |
| Gas Processing |  |  |  |  |
| Value in Natural Gas |  | 51,237,858 | 10,661.0 | 0.208 |
| Value Added by Gas Processing |  | 51,237,858 | 11,643.4 | 0.227 |
| Fractionation |  | 51,237,858 | 2,387.5 | 0.047 |
| Gas Plants (With Fractionation) |  | 51,237,858 | 24,692.0 | 0.482 |
| EIA Product Imports |  |  |  |  |
| Imported Product Value (CIF) |  | 2,760,691 | 2,355.5 | 0.853 |
| Canadian Imports |  | 2,239,297 | 1,826.3 | 0.816 |
| Non-Canadian Imports |  | 521,394 | 529.2 | 1.015 |
| Terminaling | - | 2,760,691 | 54.8 | 0.020 |
| Imports (With Terminaling) |  | 2,760,691 | 2,410.3 | 0.873 |
| Inventory Change |  | $(1,003,548)$ | (205.0) | 0.204 |
| Supply |  | 63,011,371 | 37,507.5 | 0.595 |
| Import Adjust. (Imports Not Counted by EIA) |  | $(417,423)$ | (279.4) | 0.669 |
| Aux Sable Value Added by Gas Processing and Frac. |  | 2,389,632 | 808.8 | 0.338 |
| Aux Sable Value of Canadian Gas |  | 2,389,632 | 456.4 | 0.191 |
| Total Supply |  | 64,983,580 | 38,493.3 | 0.592 |
| Exports |  |  |  |  |
| Export Product Value |  | 14,809,706 | 12,184.8 | 0.823 |
| Terminaling |  | 14,809,706 | 529.2 | 0.036 |
| Export Value (FOB) |  | 14,809,706 | 12,714.0 | 0.858 |
| Domestic Demand |  | 47,671,841 | 36,246.5 | 0.760 |
| Balancing Item |  | 2,502,033 | (3.4) | (0.001) |
| Total Domestic Demand (Wholesale Value) |  | 50,173,874 | 36,243.0 | 0.722 |
| Supply Value |  | 50,173,874 | 27,665.6 | 0.551 |
| Wholesale Value |  | 50,173,874 | 36,243.0 | 0.722 |
| Wholesale Market Services |  | 50,173,874 | 8,577.4 | 0.171 |
| Breakout of Wholesale Market Services |  |  |  |  |
| Long Distance P/L Transportation |  |  | 1,648.3 |  |
| Intra PAD P/L Transporation |  |  | 1,081.9 |  |
| Storage and Wholesale Markup |  |  | 5,847.2 |  |
| Wholesale Value Balancing Item |  |  | 828.0 |  |
| Total Wholesale Market Services |  | 50,173,874 | 9,405.4 | 0.187 |
| Final Retail Values |  |  |  |  |
| Wholesale Value |  | 50,173,874 | 36,243.0 | 0.722 |
| Retail Markup on Total Volume |  | 50,173,874 | 10,584.2 | 0.211 |
| Total Retail Value |  | 50,173,874 | 46,827.2 | 0.933 |

### 4.3. Economic Impact from the Manufacture of Propane Appliances and Engines

The economic impact in the U.S. from the manufacturing, distribution, and installation of propane engines, appliances, and other propane end use equipment that was installed or purchased in 2018 is estimated to be $\$ 12.3$ billion, consisting of $\$ 4.1$ billion of direct propane consumers spending and $\$ 8.2$ billion from indirect/induced economic benefits. The table below shows the capital outlays from consumers and total economic impacts from that spending by sector and type of propane equipment.

Table 19. Economic Impact from Manufacturing Activities (\$Millions)

| Manufacturing Category | Consumer Spending (Direct) | Indirect | Induced | Total |
| :---: | :---: | :---: | :---: | :---: |
| Residential Sector | 3,587.2 | 3,122.7 | 4,056.1 | 10,766.0 |
| New Construction | 629.5 | 548.0 | 711.8 | 1,889.3 |
| Conversions / Upgrades | 186.8 | 162.6 | 211.2 | 560.6 |
| Appliance Replacements | 1,806.5 | 1,572.5 | 2,042.6 | 5,421.7 |
| Propane BBQs | 964.5 | 839.6 | 1,090.5 | 2,894.5 |
| Commercial Sector | 88.7 | 77.2 | 100.3 | 266.3 |
| Internal Combustion Engines | 368.6 | 320.9 | 416.8 | 1,106.3 |
| Fork Lifts | 291.8 | 254.0 | 329.9 | 875.7 |
| School Buses | 23.4 | 20.4 | 26.5 | 70.2 |
| LDV/MDVs | 21.7 | 18.9 | 24.5 | 65.1 |
| Irrigation / Mowers | 31.8 | 27.6 | 35.9 | 95.3 |
| Agricultural Products | 28.1 | 24.5 | 31.8 | 84.4 |
| Industrial / Other | 23.4 | 20.3 | 26.4 | 70.1 |
|  |  |  |  |  |
| Total Impact | 4,096 | 3,566 | 4,631 | 12,293 |
| Source: ICF |  |  |  |  |

### 4.3.1 Residential Sector Propane Equipment Usage <br> Residential Propane Consumption

The Residential sector accounts for the largest share of the domestic retail propane industry, with odorized propane sales totaling 5.2 billion gallons in 2018 , or roughly 55.6 percent of the 2018 total retail propane sales.

The average residential customer of a propane retailer consumed 436 gallons per account, however, there are wide variations based on the region and local weather conditions and the share of local accounts that use propane for space heating. In North Dakota a residential consumer account averaged over 800 gallons, while in Florida the average usage per residential customer was 120 gallons.

On a national basis, space heating accounts for the majority of propane usage in the residential sector, accounting for two thirds of consumption. The figure below shows the total residential propane demand by end-use. Water heating accounted for 21 percent residential propane fuel usage in 2018.

Figure 18. Residential Odorized Propane Consumption by End-Use


Source: ICF, PERC, EIA Residential Energy Consumption Survey

## Propane Appliance Installations by Market Installation Category

This analysis will look at the major appliance purchases in the residential sector for space and water heating equipment, cooking ranges, and indoor fireplaces. To estimate the number of propane appliances purchased and installed each year, ICF looked at four separate residential housing market segments for new appliances.

The figure below shows the number of new appliance installations by the type of appliance and four different types of market installation.

In 2018, ICF estimates that there was a nearly 780,000 propane appliance installations consisting of 333,650 appliances installed in newly built households, 375,400 replacement appliances in existing households, and 20,240 appliances installed in new manufactured households, and 50,420 appliances in households that converted from another fuel to propane.

Figure 19. Residential Appliance Installations by Type and Construction Status


Source: ICF

These four market installations and the approach to estimate the appliance installations in provided below:

## New Household Construction:

ICF used estimates of new construction by the primary space heating fuel from the U.S. Census' Survey of Construction (SOC). ${ }^{21}$ This provides a detailed estimate of the physical characteristics of newly built households at the census division level for the country, including the types of major appliances installed and primary space heating fuel choice. ICF they used state-level new residential construction permit data to estimate the number of newly built households within each state.

According to the Survey of Construction data, there were a total of 1.5 million newly constructed households in 2018. Of these, 71,600 households used propane as the primary space heating fuel.

The majority of these propane households were built in the Midwest and Northeast, totaling 24,000 and 22,000 respectively. There were 18,000 new propane fueled households built in the Western U.S. and 7,500 built in the Southern U.S., where propane has the lowest share of primary space heating fuels used in new construction.

## New Manufactured Household Construction:

In 2018, there were a total of 96,600 shipments of new manufactured households, a 4 percent increase from the prior year's totals. ${ }^{22}$ Compared to site-built households, manufactured households have a significantly different suite of appliances included within the building as well as the sizing of these appliances.

ICF estimates that propane would be used as a primary space heating fuel in 9 percent of newly shipped manufactured households, or roughly twice the market share of propane used in site-built households. This estimate was based on the large share of shipments of manufactured households to rural areas with more limited access to natural gas distribution lines. Based on this assumption, ICF assumes that there were roughly 8,960 manufactured households that installed a propane space heating system, 5,370 propane water heater systems, and 5,910 other propane appliances to total 20,240 total propane appliances installed (Figure 19).

## Conversions from other Fuels to Propane:

Propane serves as a primary space heating fuel in largely rural areas that have more limited access to natural gas and where low-cost electric space heating is not readily available. In these areas, there are traditionally large number households that have used Fuel Oil for primary space heating purposes, as well as more limited number of households that have used Wood or other nontraditional fuels.

The conversion away from Fuel Oil heated households to Propane is the most common form of household fuel conversion. In 2018 there were a total of 5.4 million households that had used Fuel Oil for primary space heating, a decline of over 1 million households over the last five years.

[^9]ICF estimates that in 2018, there were nearly 24,000 new propane heated households that ICF estimates were added in 2018. These conversions occur in areas where there is a large residential Fuel Oil usage, such as the Northeast and Midwest.

## Replacements of Propane Appliances in Existing Households:

In 2018, there were roughly 5.8 million households that used propane as a primary space heating fuel and another 5.1 million households that use propane for water heating or as a back-up space heating fuel. ICF estimates that nearly 250,000 households that were already using propane appliances, replaced 375,000 propane appliances. This figure indicates that roughly 4.3 percent of existing residential propane customers replaced an appliance in 2018.

## State-Level Households Appliance Installations

In 2018, ICF estimates that a total of 354,000 new and existing households replaced nearly 777,000 propane appliances. The below figure shows the number of households in each of the four market installation categories by state. This figure does not include propane fired BBQs.

Figure 20. Number of Households with New Propane Appliances by State


Source: ICF

## Propane Fired Home Barbeques

According the EIA's Residential Energy Consumption Survey, there are over 42 million homes that use propane for outdoor grilling activities. BBQs that use a gaseous fuels ${ }^{23}$ represented 64 percent of all outdoor grills used in the U.S. according to the Hearth, Patio \& Barbeque Association, which provides information on total ownership of BBQs and annual manufacturer shipments.

Based on estimated BBQ shipment data, ICF estimates that in 2018 there were nearly 6.5 million new propane-fired BBQs purchased by consumers. The cost of BBQs can range significantly, from

[^10]small portable grills to custom-built outdoor installations. ICF has used an average cost of a propane BBQ from a standard two-burner BBQ available at home improvement stores to calculate the amount that consumers spent on propane BBQs, which totaled nearly $\$ 1$ billion.

### 4.3.2 Commercial Sector Propane Equipment Installations

 Commercial Propane ConsumptionOdorized propane sales to the commercial sector accounted for 20.6 percent of the 2018 total retail propane sales, or roughly 1.9 billion gallons. In 2018, propane retailers sold these volumes to nearly 1.1 million commercial propane accounts across the country with an average sales of 1,765 gallons per account.

The commercial sector accounts for the second largest number of buildings, behind residential, with a 92 million square feet of commercial floor space, an increase from the 87.1 million square feet in 2012. ${ }^{24}$

## Commercial Appliance Installations by Market Installation Category

ICF estimates that a total of 9,450 major propane appliances were installed in newly built commercial buildings in 2018, including 4,320 space heaters, 2,840 commercial water heaters, and over 2,000 propane fired food preparation or cooking systems. These installations represent over $\$ 88.7$ million in direct consumer spending.

ICF's estimate on the number of commercial appliance installations is based on analysis of commercial building types, energy consumption, and appliance information from the EIA Commercial Building Energy Survey. This survey is conducted every periodically and includes detailed information and estimates for the entire commercial sectors, including new commercial construction, major appliance replacements, and key trends in energy and fuel usage. ${ }^{25}$

From 2003 to 2012, there was an average of 126,000 new commercial buildings per year, representing roughly 13.4 million square feet of floor space. Similar to the residential sector, propane usage in the commercial sector is significantly more limited than electricity and natural gas use. Over this ten-year period, propane is being used in 7.2 percent of the newly built commercial buildings. However, when only looking at new businesses that use propane for space heating, the share of new commercial businesses declines to just 3.4 percent of newly built commercial businesses, or roughly 4,320 new commercial businesses added per year.

Figure 21 shows the annual average from 2003 to 2012 of new businesses that reported using propane. There are two types of propane use. One category for businesses that use propane for space heating and other end uses. The other category includes businesses that use propane for any other end use except space heating. These breakouts are shown by the major industry type to provide estimates on the different types of major appliances required as part of the business.

[^11]Figure 21. Average Number of New Commercial Businesses that Use Propane by Industry Type (2003 to 2012)


### 4.3.3 Propane Internal Combustion Engines

The economic impact of new propane engines is estimated to be $\$ 1.1$ billion, including $\$ 368$ million in direct engine purchases by consumers. Included in this economic impact are forklift engines, irrigation engines, commercial lawn mower engines, and vehicle engines for Light Duty Vehicles (LDV), Medium Duty Vehicles (MDV), and school buses.

In 2018, the World LPG Association estimated that there were nearly 27 million propane fueled vehicles and that propane was the third most widely used transportation fuel. ${ }^{26}$ In the U.S., the Propane Education and Research Council estimated that there are over 150,000 vehicles that utilize propane as the primary fuel source currently on the road, accounting for roughly 0.1 percent of the total fuel usage across the transportation sector. ${ }^{27}$

To support this fleet of propane autogas vehicles, there is a large network of public and private propane fueling stations. The U.S. Department of Energy's Alternative Fuels Data Center (AFDC) provides a listing off the public alternative fueling locations. ${ }^{28}$ However, a large number of propane autogas vehicles are part of private fleet operations that are not reported in this public directory. ICF estimates that private propane fueling facilities account for 50 percent of the total number of propane fueling stations.

Based on analysis of the number of new public propane fueling stations that began operation, 26 in 2018 total, ICF estimates that there were a total of 52 new propane fueling stations that year. Costs of new propane fueling stations will depend on a variety of factors, such as location, size of facility,

[^12]if the facility is stand-alone of sharing infrastructure, and type of fleet that is being serviced. Compared to a traditional gasoline fueling station, propane fueling stations require significantly less upfront capital. PERC provides a range for new propane fueling stations between $\$ 15,000$ and \$225,000. ${ }^{29}$

The addition of these facilities brought the total number of propane fueling stations online in the U.S. to 819. Texas and California have the most stations, with 139 and 59 propane fueling stations, representing $24 \%$ of the nation's propane fueling stations. The number of stations and type of facility are shown by state in the figure below.

Figure 22. Number of Public Propane Fueling Stations by State


Source: U.S. Department of Energy, Alternative Fuels Data Center

## Propane Fueled School Buses

School buses are a key part of the fabric of daily life for millions of school children across the U.S. In 2018, there were an estimated 476,150 school buses across the country that transported over 23 million students to school each week. ${ }^{30}$

Traditionally, these vehicles have been powered by diesel or gasoline fueled engines. However, in recent year's alternative fueled vehicles options have become more common, lead in large part by in an increase in the number of new propane fueled school buses.

[^13]There are three major manufactures of propane fueled buses. Blue Bird, IC Bus, and Thomas Built Bus. This

- Blue Bird is the largest manufacturer of propane fueled school buses, with over 12,000 buses built. ${ }^{31}$ Blue Bird is headquartered in Georgia where the company manufactured nearly 12,000 school buses in 2018 and 2019. The company has over 50 dedicated dealers across the country, selling propane fueled school buses as well as other engine configurations offered.
- North Carolina based Thomas Built Bus ${ }^{32}$ manufactures multiple engine types for its fleet of buses, including alternative fuel vehicles that run on propane. Thomas Built Bus has partnered with several firms that produced the propane fueled engines for its vehicles, including Agility Fuel Solutions, formerly CleanFuel USA, and Power Solution International.
- IC Bus is a subsidiary of Navistar International and manufactures school and commercial buses in North American. The company's operations are centered in Oklahoma and Arkansas and it has over 700 distribution locations across North American through its parent company. The company began manufacturing propane fueled school buses in 2015 and is one of several types of alternative fueled vehicles on offer.

In 2018, there were a total of 39,692 school buses sold in the U.S., down slightly from the prior year. ICF estimates that there were roughly 2,600 were new propane-fueled vehicles built and sold during 2018, bringing the total number of active propane school buses to more than 17,000. Industry forecasts indicate an overall strong outlook for new school buses of over 35,000 new shipments per year. Propane fueled buses are expected to see yearly growth in market share as several states and school districts expand their purchases of these vehicles.

Figure 23 shows the estimated number of operating propane-fueled school buses and the share that those vehicles represent of the state's total school bus fleet. Texas has over 2,800 propane fueled school buses that account for roughly $6.6 \%$ of the state's total school bus fleet. California, Pennsylvania, Oregon, and Wisconsin are the states with next largest propane fueled fleets in the U.S. These top five states have a total of more than 7,700 propane vehicles and $45 \%$ of the total propane school buses in the U.S.

[^14]Figure 23. Number of Propane Fueled School Buses and Share of Total School Bus Fleet by State


Source: Propane Education \& Research Council, School Bus Fleet, ICF

## Propane Fueled Forklifts

Forklifts are used in a variety of commercial and industrial settings, both indoors and outdoors, to transport heavy materials. It is estimated that are over 850,000 forklifts active across the county. PERC estimates that there are roughly 500,000 propane fueled forklifts operating in the U.S. These propane powered forklifts consumed nearly 400 million gallons of odorized propane in 2018.

Propane fueled forklifts are a key leading support warehousing activity and are separated into five separate classes. Class 1 \& Class 2 forklifts are powered by electric engines and are a key competitor to propane powered engines. Class 4 \& Class 5 forklifts are categorized as using an internal combustion engine. Within this class of forklifts propane has a market share above 90 percent, followed by diesel powered units, and a minimal number of forklifts using gasoline.

In 2018, there were 231,696 total forklifts shipped. ${ }^{33}$ Electric Class 1 \& 2 engines accounted for roughly 36 percent of these shipments, while shipments of propane powered forklifts totaled 33 percent of total shipments, or roughly 77,000 new propane fueled forklifts shipped. Figure 24 shows the number of new forklift shipments over the last decade by the type of forklift class and the estimated number of propane powered forklifts.

[^15]Figure 24. New U.S. Forklift Shipments by Class


Source: PERC, Machine Maxx USA Annual Forklift Reports
The figure below shows the state-level shipments of propane forklifts. These state level estimates show where the propane forklifts were delivered and do not represent the location where the propane engines, or full forklifts, are manufactured, assembled, and sold.

Figure 25. Number of 2018 Propane Forklift Shipments by State


According to the U.S. Department of Agriculture's 2018 Irrigation and Water Management Survey, there were 600,500 irrigation pumps on more than 160,000 farms. ${ }^{34}$ The primary purpose of these pumps is to water from wells to the surrounding land. A majority of these irrigation pumps are run on electricity, particularly when there is ready access to electric lines. Natural Gas and diesel are also used as fuel sources for irrigation pumps.

The 2018 survey indicates that there were 443,694 pumps powered by electricity, 102,865 pumps powered by diesel, 29,041 pumps powered by natural gas, 11,176 propane powered irrigation pumps, and a smaller number of pumps powered by gasoline, solar, or other fuels. ${ }^{35}$

In recent years propane has made significant in-roads as a portable fuel that can be used to power agricultural engines that support farmers in providing irrigation water for their crops. These engines have been displacing traditional diesel-powered units due to competitive costs, improved local emissions, and the relative ease in fueling given little to no infrastructure is required to support these engines.

## Commercial Mowers Engines

Propane has a distinct advantage as a portable fuel for commercial mowing owing to a cleaner particulate emissions profile than diesel and gasoline fuels, and reliability and range compared to electric engines. In recent year, PERC has developed multiple programs to support increased penetration of propane engine use in this sub-sector. ${ }^{36}$

Based on available market data and information provided by PERC, ICF estimates that in 2018 there were a total of 7,310 new commercial mower engines sold. While large commercial mowers can cost the equivalent of a small car, the cost of a propane engine typically range between $\$ 500$ and $\$ 2,500$.

### 4.3.4 Other Agricultural Products

Odorized propane sales to the agricultural sector accounted for 10.4 percent of the 2018 total retail propane sales, or roughly 966 million gallons.

A majority of propane used in the agricultural sector is used by farmers to dry grain harvests. However, there are a wide variety of other uses of propane across America's agricultural sector, including propane fueled torches used for weeing control, radiant heating systems for hog and chicken farms, and the heating of greenhouses. Propane use for irrigation engines is detailed in a prior section.

There are limited public sources of information for the purchase of propane equipment and appliances in the agricultural sector. ICF's estimate for the economic impact for manufacturing of new equipment is based on estimates from PERC on the penetration of newly developed propane appliances.

[^16]The economic impact of new propane fueled agricultural equipment, excluding irrigation engines, is estimated to be $\$ 84.4$ million, including $\$ 28.1$ million in direct equipment purchases by consumers.

### 4.3.5 Industrial Sector

Odorized propane sales to the Industrial (non-Forklift) sector accounted for 4.4 percent of the 2018 total retail propane sales, or roughly 411 million gallons. The average size of an industrial customer account was 2,230 gallons in 2018, more than five times the size of a residential account for propane retailers.

There is a lack of available public information on the industrial sector's fuel consumption at a detailed enough level to estimate the number of new appliance or engine installations. The use of propane in the industrial sector can vary dramatically by the type of industry and availability of competing fuels or feed stocks.

Given this heterogeneous nature of propane use in industrial applications, ICF is not able to conduct an assessment of all new propane engines and appliances purchased or installed in 2018.

The economic impact of new propane fueled industrial equipment is limited to on-site generators that can be used to meet heating requirements or act as a portable power source. ICF estimates that there were a roughly 1,100 new industrial generators purchased domestically in 2018, representing a total economic contribution of $\$ 70.1$ million for the year.

## 5. National Overview by State

The graphs on the following pages present a ranking of each state for each of the metrics outlined. These graphs represent key indicators of the economic and employment impacts from the propane, retail propane, and entire NGL value chain. The title of each map refers to the information being presented and includes the propane heated households, employment, wage, and the economic impacts.

### 5.1. Residential Propane Accounts and Primary Heated Households by State

Figure 26. Residential Propane Accounts and Primary Heated Households by State


Impact of the U.S. Consumer Propane Industry on U.S. and State Economies in 2018

### 5.2. Retail Propane Employment by State

Figure 27. Retail Propane Employment by State (Section 3)


Impact of the U.S. Consumer Propane Industry on U.S. and State Economies in 2018

### 5.3. Retail Propane Wages (\$ Millions) by State

Figure 28. Retail Propane Wages (\$ Millions) by State (Section 3)


Impact of the U.S. Consumer Propane Industry on U.S. and State Economies in 2018

### 5.4. Total Propane Employment by State

Figure 29. Total Propane Employment by State (Section 3)


Impact of the U.S. Consumer Propane Industry on U.S. and State Economies in 2018

### 5.5. Total Propane Wages (\$Millions) by State

Figure 30. Total Propane Wages (\$Millions) by State (Section 3)


Impact of the U.S. Consumer Propane Industry on U.S. and State Economies in 2018

### 5.6. Total Employment from Natural Gas Liquids and Propane by State

Figure 31. Total Employment from Natural Gas Liquids and Propane by State (Section 3)


Impact of the U.S. Consumer Propane Industry on U.S. and State Economies in 2018

### 5.7. Total Wages (\$Millions) from Natural Gas Liquids and Propane by State

Figure 32. Total Wages (\$Millions) from Natural Gas Liquids and Propane by State (Section 3)


Impact of the U.S. Consumer Propane Industry on U.S. and State Economies in 2018

### 5.8. Direct Added Value from Odorized (Retail) Propane by State

Figure 33. Direct Added Value from Odorized (Retail) Propane by State (Section 4)


Impact of the U.S. Consumer Propane Industry on U.S. and State Economies in 2018

### 5.9. Indirect and Induced Added Value (\$Millions) from Retail Propane by State

Figure 34. Indirect and Induced Added Value (\$millions) from Retail Propane by State (Section 4)


Impact of the U.S. Consumer Propane Industry on U.S. and State Economies in 2018

### 5.10. Total Added Value (\$Millions) from Retail Propane by State

Figure 35. Total Added Value (\$Millions) from Retail Propane by State (Section 4)


Impact of the U.S. Consumer Propane Industry on U.S. and State Economies in 2018

### 5.11. Total Added Value (\$Millions) from Propane by State

Figure 36. Total Added Value (\$Millions) from Propane by State (Section 4)


## A.Appendix: Odorized Propane Industry's Impact on the U.S. Economy by State

The tables on the following pages present the detailed findings of the value chain analysis at the national and state level.

The top left table on each page shows total odorized propane sales for the region (numbers may not add to total due to independent rounding). These sales are split by end use, with the total number of households using propane for primary space heating shown below.

The top right table shows the odorized propane industry's total contribution to GDP. For the national total, this includes a calculation for domestic and imported direct value. At the state level, the difference between the top-line Total Market Value and the Total Direct Value Added is the difference between in-state propane production and odorized propane brought in from, or sent out to, other states. The final two lines in the table show the indirect and induced value added, as calculated by ICF and allocated to the state level, and the total contribution to national/state/district GDP.

The two boxes in the middle of the page show total employment and wages attributed to odorized propane, allocated by sector. In addition, the first page, showing the U.S. total, shows ICF's estimates for indirect and induced labor and wages at the national level.

The box at the bottom of the page shows production details. At the state level, only refinery and gas processing plant production are shown. For each state, that state's contribution to total U.S. odorized propane production is also shown. Nationally, production is further split into the share of odorized propane coming from domestic and imported feedstock, including Canadian and non-North American crude as well as Canadian "wet" natural gas. The two right-most boxes on the U.S. total table show for every source of odorized propane the share produced from domestic and North American feedstock, including the final share at the bottom.

As illustrated in the Total U.S. table below, odorized propane consumed in the United States is primarily a North American energy resource. Over 85 percent of the product used in the retail propane segment is sourced domestically, with roughly 10 percent imported from Canada, and the remaining 5 percent of propane supply sourced from imported crude oil. As a result of the sharp increase in domestic propane supplies from natural gas production the U.S. now has a much higher degree of domestically supplies propane relative to crude oil, the feedstock for gasoline and distillate, which still imports a large percent of its domestic consumption.

## End-Use Categories, as defined by the Annual Retail Propane Sales Report

## Residential Sector:

Residential propane sales include odorized propane delivered to and used by residential consumers at their place of residence for fixed applications. Uses include space heating, water heating, cooking, spa/pool use, and other household uses. Residential sector sales include delivery and replacement of 100-pound cylinders attached at fixed locations. Residential sales do not include household use of propane from 20-pound (or similar) cylinders used for portable appliances and applications.

## Commercial Sector:

Commercial sector propane sales include odorized propane delivered to and used by commercial entities, such as schools, hospitals, retail outlets, office buildings, and other types of non-industrial outlets. Commercial sales do not include propane used forklifts or engine use. Commercial sales include propane used in on-site standby or backup electric generation at the facility.

## Industrial (Non-Forklift) Sector:

Industrial (non-forklift) sector propane sales include odorized propane delivered to and used by industrial or manufacturing facilities for process heating, large scale combined heat and power systems, distributed generation, or as a fuel for furnaces. Propane used by industrial customers in forklifts or other internal combustion engines is reported as Internal Combustion and is not included in industrial (nonforklift) sector.

## Agricultural Sector:

Agricultural sector propane sales include odorized propane delivered to and used by agricultural entities that are primarily engaged in growing crops, raising animals, or other agricultural products. Agricultural sector sales include propane used for grain drying, agricultural harvesting activities, weed control, radiant heating systems, crop irrigation engines, and other related agricultural applications. Propane used by agricultural customers in other internal combustion engine applications is reported in the Internal Combustion category.

## Cylinder Markets:

Cylinder market sales include Consumer Bottle Refill \& Exchange and Rental Yards / RV Refill Stations / Other categories. Propane that is delivered and used in a 20-pound (or similar) cylinder. The definition of propane cylinder markets does not include wholesale or bulk propane sales to other propane retailers, fixed 100-pound (or similar) cylinders attached at fixed residential locations, or cylinders used by forklifts, commercial mowers, or other internal combustion engines.

## Internal Combustion:

The Internal Combustion sector includes odorized propane sales for use in internal combustion engines (other than agricultural irrigation engines) in the Propane Autogas, Material Handling (Forklift), and nonRoad categories.

## A. 1 Odorized Propane's Impact on Total U.S. Economy

| 2018 Odorized Propane Sales Breakout |  |  |
| :---: | :---: | :---: |
|  | (1,000 Gal.) | (\% of rotal) |
| Residential | 5,184,478 | 55.6\% |
| Commercial | 1,924,122 | 20.6\% |
| Cylinder | 354,431 | 3.8\% |
| Internal Combustion | 479,288 | 5.1\% |
| Industrial | 411,700 | 4.4\% |
| Agricultural | 965,883 | 10.4\% |
| Total United States Odorized Propane Demand | 9,319,900 | 100.0\% |
| Total Propane-Heated Households | 5,785,087 |  |
| Propane Share of United States | me Heating | 4.76\% |

## 2018 Contribution to the U.S. Economy (\$1,000)

| Total Market Value of Odorized Propane Sold | $\mathbf{\$ 1 7 , 7 3 1 , 8 9 6}$ |
| :--- | ---: |
| in the United States | $-\$ 862,367$ |
| Value in Imported Product and Feedstock | $\$ 16,869,529$ |
| Total Market Value of Odorized Propane of | $\$ 4,551,461$ |
| Domestic Origin Sold in the United States | $\$ 1,165,542$ |
| Supply | $\$ 11,304,778$ |
| Transportation, Storage, and Wholesale | $\$ 17,021,781$ |
| Retail | $\mathbf{3 6 , 5 9 6 , 8 2 9}$ |
| Total Direct Value Added in United States | $\$ 53,618,610$ |
| Indirect and Induced Value Added |  |
| Total Odorized Propane Industry Contribution |  |
| to United States GDP |  |


| 2018 Employment |  |
| :--- | ---: |
|  |  |
| Production |  |
| Transportation, Storage, and Wholesale | 21,174 |
| Retail | 2,072 |
| Direct United States Employment Related to | $\mathbf{4 3 , 8 6 4}$ |
| Odorized Propane | $\mathbf{5 7 , 1 1 0}$ |
| $\quad$ Indirect and Induced Labor | 39,977 |
| Total United States Employment Related to | $\mathbf{9 7 , 0 8 7}$ |
| Odorized Propane |  |


| 2018 Labor Income |  |
| :--- | ---: |
|  | $\mathbf{( \$ 1 , 0 0 0 )}$ |
| Production | $\$ 1,255,950$ |
| Transportation, Storage, and Wholesale | $\$ 176,114$ |
| Retail | $\$ 2,776,019$ |
| Direct Labor Income in United States Odorized <br> Propane Industry | $\mathbf{\$ 4 , 2 0 8 , 0 8 3}$ |
| $\quad$ Indirect and Induced Labor | $\$ 5,260,103$ |
| Total Labor Income in the United States <br> Related to Odorized Propane | $\mathbf{\$ 9 , 4 6 8 , 1 8 6}$ |


| 2018 Odorized Propane Supply |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | (1,000 Gal.) |  |  |  | Share of Supply (\%) |  |
|  | Domestic | Canadian | From Outside N. America | Total | From U.S. | From N. America |
| Odorized Propane from Crude | 804,202 | 270,555 | 408,443 | 1,483,204 | 8.63\% | 11.53\% |
| Odorized Propane from Natural Gas | 7,142,768 | 231,993 | - | 7,374,765 | 76.64\% | 79.13\% |
| Total Odorized Propane Produced in the United States | 7,946,970 | 502,548 | 408,443 | 8,857,969 | 85.27\% | 90.66\% |
| Odorized Propane Imports |  | 434,412 | 45,351 | 479,763 | 0.00\% | 4.66\% |
| Inventory Changes | $(17,817)$ |  |  | $(17,817)$ | -0.19\% | -0.19\% |
| Total Supply of Odorized Propane in the United States | 7,929,153 | 936,960 | 453,794 | 9,319,915 | 85.08\% | 95.13\% |

Source: Total Home Heating Market Share for Propane includes Single and Multi-Family Housing, as well as Boats, RVs, and other Full-time Residences

Impact of the U.S. Consumer Propane Industry on U.S. and State Economies in 2018

## A. 2 Odorized Propane's Impact on Total U.S. Economy

|  | In-State Production |  | In State Consumption |  | Economic Impact |  | Propane Heated Households |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| State | Total Volume (1,000 Gal) | Share of U.S. Total (\%) | Total Volume (1,000 Gal) | Share of U.S. Total (\%) | Direct <br> Labor | Total Value Added (\$1,000) | Householde | Market <br> Share (\%) |
| Alabama | 1,034,385 | 11.41\% | 104,090 | 1.12\% | 1,612 | 1,192,665 | 115,419 | 6.22\% |
| Alaska | 146 | 0.00\% | 14,186 | 0.15\% | 402 | 174,798 | 3,831 | 1.52\% |
| Arizona | - | 0.00\% | 101,760 | 1.09\% | 508 | 320,889 | 68,183 | 2.75\% |
| Arkansas | 127,330 | 1.40\% | 90,866 | 0.97\% | 529 | 362,919 | 79,387 | 6.92\% |
| California | 65,318 | 0.72\% | 521,173 | 5.59\% | 2,821 | 1,475,007 | 415,492 | 3.22\% |
| Colorado | 81 | 0.00\% | 186,778 | 2.00\% | 982 | 776,086 | 98,438 | 4.73\% |
| Connecticut | - | 0.00\% | 134,056 | 1.44\% | 1,116 | 531,173 | 52,619 | 3.86\% |
| Delaware | - | 0.00\% | 53,731 | 0.58\% | 21 | 227,274 | 35,829 | 10.17\% |
| District of Columbia | - | 0.00\% | 4,137 | 0.04\% | 5 | 100,975 | 2,926 | 1.05\% |
| Florida | 164,358 | 1.81\% | 216,829 | 2.33\% | 1,773 | 1,025,783 | 72,285 | 0.96\% |
| Georgia | - | 0.00\% | 218,237 | 2.34\% | 1,474 | 812,708 | 177,239 | 4.84\% |
| Hawaii | - | 0.00\% | 40,523 | 0.43\% | 6 | 336,740 | 5,307 | 1.17\% |
| Idaho | 223 | 0.00\% | 66,944 | 0.72\% | 188 | 427,047 | 29,774 | 4.89\% |
| Illinois | 135,009 | 1.49\% | 385,597 | 4.14\% | 1,068 | 2,204,957 | 198,002 | 4.11\% |
| Indiana | - | 0.00\% | 232,892 | 2.50\% | 1,198 | 1,231,074 | 180,475 | 7.11\% |
| Iowa | - | 0.00\% | 464,656 | 4.99\% | 397 | 2,017,475 | 163,764 | 13.08\% |
| Kansas | 222,594 | 2.46\% | 123,992 | 1.33\% | 658 | 1,218,034 | 85,570 | 7.63\% |
| Kentucky | 904 | 0.01\% | 105,499 | 1.13\% | 531 | 715,361 | 106,305 | 6.16\% |
| Louisiana | 243,655 | 2.69\% | 49,906 | 0.54\% | 685 | 689,355 | 37,734 | 2.17\% |
| Maine | - | 0.00\% | 165,582 | 1.78\% | 1,095 | 639,770 | 52,708 | 9.51\% |
| Maryland | - | 0.00\% | 123,588 | 1.33\% | 1,023 | 831,638 | 72,677 | 3.33\% |
| Massachusetts | - | 0.00\% | 139,295 | 1.49\% | 964 | 654,886 | 83,401 | 3.23\% |
| Michigan | 6 | 0.00\% | 569,045 | 6.11\% | 1,622 | 3,126,068 | 320,680 | 8.25\% |
| Minnesota | - | 0.00\% | 497,796 | 5.34\% | 1,204 | 2,613,112 | 223,289 | 10.37\% |
| Mississippi | 108,563 | 1.20\% | 109,529 | 1.18\% | 801 | 736,220 | 128,596 | 11.65\% |
| Missouri | - | 0.00\% | 287,431 | 3.08\% | 1,086 | 1,914,908 | 213,192 | 8.93\% |
| Montana | 1,400 | 0.02\% | 105,285 | 1.13\% | 330 | 418,243 | 50,070 | 11.92\% |
| Nebraska | - | 0.00\% | 107,796 | 1.16\% | 239 | 774,201 | 56,003 | 7.48\% |
| Nevada | - | 0.00\% | 47,914 | 0.51\% | 250 | 209,280 | 28,298 | 2.69\% |
| New Hampshire | - | 0.00\% | 185,797 | 1.99\% | 1,123 | 423,710 | 81,344 | 15.44\% |
| New Jersey | - | 0.00\% | 82,229 | 0.88\% | 757 | 432,989 | 61,831 | 1.93\% |
| New Mexico | 122,291 | 1.35\% | 80,365 | 0.86\% | 1,053 | 518,115 | 59,100 | 7.67\% |
| New York | - | 0.00\% | 418,017 | 4.49\% | 2,830 | 1,789,215 | 274,348 | 3.76\% |
| North Carolina | - | 0.00\% | 393,191 | 4.22\% | 2,745 | 1,291,038 | 280,434 | 7.24\% |
| North Dakota | 55,768 | 0.62\% | 120,529 | 1.29\% | 881 | 741,295 | 40,253 | 12.92\% |
| Ohio | 69,282 | 0.76\% | 312,128 | 3.35\% | 1,473 | 2,241,938 | 241,227 | 5.21\% |
| Oklahoma | 878,225 | 9.69\% | 138,022 | 1.48\% | 1,708 | 1,826,424 | 98,458 | 6.70\% |
| Oregon | - | 0.00\% | 92,455 | 0.99\% | 331 | 575,524 | 27,283 | 1.74\% |
| Pennsylvania | 41,441 | 0.46\% | 379,570 | 4.07\% | 2,480 | 1,629,642 | 209,004 | 4.17\% |
| Rhode Island | - | 0.00\% | 32,728 | 0.35\% | 276 | 482,629 | 11,518 | 2.80\% |
| South Carolina | - | 0.00\% | 106,696 | 1.14\% | 983 | 611,561 | 74,302 | 3.97\% |
| South Dakota | - | 0.00\% | 83,306 | 0.89\% | 232 | 528,951 | 53,053 | 15.63\% |
| Tennessee | 888,132 | 9.80\% | 117,859 | 1.26\% | 1,796 | 1,803,958 | 101,513 | 3.99\% |
| Texas | 3,097,930 | 34.18\% | 386,445 | 4.15\% | 7,705 | 5,478,122 | 291,843 | 3.09\% |
| Utah | 58,399 | 0.64\% | 55,851 | 0.60\% | 335 | 514,101 | 20,253 | 2.16\% |
| Vermont | - | 0.00\% | 119,077 | 1.28\% | 646 | 509,884 | 40,879 | 15.81\% |
| Virginia | - | 0.00\% | 250,287 | 2.69\% | 1,620 | 1,102,672 | 138,822 | 4.47\% |
| Washington | - | 0.00\% | 194,195 | 2.08\% | 845 | 706,751 | 83,427 | 3.03\% |
| West Virginia | 848,131 | 9.36\% | 39,042 | 0.42\% | 856 | 1,427,555 | 34,417 | 4.67\% |
| Wisconsin | - | 0.00\% | 404,806 | 4.34\% | 1,358 | 2,079,534 | 260,306 | 11.18\% |
| Wyoming | 900,444 | 9.93\% | 58,196 | 0.62\% | 1,080 | 1,325,120 | 22,821 | 9.91\% |
| U.S. Total | 9,064,015 | 100.00\% | 9,319,903 | 100.00\% | 57,701 | 55,799,376 | 5,663,929 | 4.77\% |

## A. 3 Odorized Propane's Impact on Alabama Economy

| 2018 Odorized Propane Sales Breakout |  |  |
| :---: | :---: | :---: |
|  | (Gallons) | (\% of State) |
| Residential | 57,937,996 | 55.7\% |
| Commercial | 23,515,305 | 22.6\% |
| Cylinder | 4,842,059 | 4.7\% |
| Internal Combustion | 5,907,000 | 5.7\% |
| Industrial | 2,336,000 | 2.2\% |
| Agricultural | 9,552,000 | 9.2\% |
| Total Alabama Odorized Propane Demand | 104,090,360 | 100.0\% |
| Total Propane-Heated Households | 104,577 |  |
| Propane Share of Alabama Home Heating |  | 5.64\% |
| 2018 Employment |  |  |
|  |  |  |
| Production |  | 40 |
| Transportation, Storage, and Wholesale |  | 12 |
| Retail |  | 733 |
| Direct Alabama Employment Related to Propane | Odorized | 785 |
| 2018 Odorized Propane Production |  |  |
|  | (Gallons) | $\begin{gathered} \text { (\% of U.S. } \\ \text { Total) } \end{gathered}$ |
| Refineries | 8,704,000 | 0.59\% |
| Gas Processing Plants | 35,389,000 | 0.50\% |
| Total Alabama Odorized Propane Production | 44,093,000 | 0.51\% |


| 2018 Contribution to State Economy |  |
| :---: | :---: |
|  | $(\$ 1,000)$ |
| Total Market Value of Odorized Propane Sold in Alabama $(\$ 1,000)$ | \$205,028 |
| Supply | \$18,458 |
| Transportation, Storage, and Wholesale | \$9,968 |
| Retail | \$107,726 |
| Total Direct Value Added in Alabama | \$136,152 |
| Indirect and Induced | \$20,193 |
| Total Odorized Propane Industry Contribution to Alabama GDP | \$156,345 |


| 2018 Labor Income |  |
| :--- | ---: |
|  | $\mathbf{( \$ 1 , 0 0 0 )}$ |
|  |  |
| Production | $\$ 4,466$ |
| Transportation, Storage, and Wholesale | $\$ 1,030$ |
| Retail | $\$ 37,555$ |
| Direct Labor Income in Alabama Odorized | $\$ 43,051$ |
| Propane Industry |  |

## A. 4 Odorized Propane's Impact on Alaska Economy

## 2018 Odorized Propane Sales Breakout <br> (Gallons) (\% of State)

|  |  |  |
| :--- | ---: | ---: |
| Residential | $3,292,311$ | $23.2 \%$ |
| Commercial | $8,151,241$ | $57.5 \%$ |
| Cylinder | $1,727,797$ | $12.2 \%$ |
| Internal Combustion | 382,000 | $2.7 \%$ |
| Industrial | 613,000 | $4.3 \%$ |
| Agricultural | 20,000 | $0.1 \%$ |


| Total Alaska Odorized Propane Demand | 14,186,349 | 100.0\% |
| :---: | :---: | :---: |
| Total Propane-Heated | 5,640 |  |
| Propane Share of Alaska Home |  | 2.22\% |


| 2018 Employment |  |
| :--- | ---: |
|  |  |
| Production | 273 |
| Transportation, Storage, and Wholesale | 5 |
| Retail | 121 |
| Direct Alaska Employment Related to Odorized <br> Propane | $\mathbf{4 0 0}$ |

2018 Contribution to State Economy

| Total Market Value of Odorized Propane Sold in Alaska $(\$ 1,000)$ | \$25,748 |
| :---: | :---: |
| Supply | \$55,899 |
| Transportation, Storage, and Wholesale | \$1,934 |
| Retail | \$4,623 |


|  | $\mathbf{\$ 6 2 , 4 5 6}$ |
| :--- | ---: |
| Total Direct Value Added in Alaska | $\$ 233,655$ |
| Indirect and Induced | $\mathbf{\$ 2 9 6 , 1 1 1}$ |
| Total Odorized Propane Industry |  |
| Contribution to Alaska GDP |  |

## 2018 Labor Income

## (\$1,000)

| Production | $\$ 30,537$ |
| :--- | ---: |
| Transportation, Storage, and Wholesale | $\$ 485$ |
| Retail | $\$ 4,518$ |

Retail
\$4,518
Direct Labor Income in Alaska Odorized
Propane Industry
\$35,540

| 2018 Odorized Propane Production |  |  |
| :--- | ---: | ---: |
|  | (Gallons) <br> (\% of U.S. <br> Total) |  |
| Refineries | $6,424,000$ | $0.43 \%$ |
| Gas Processing Plants | $34,996,000$ | $0.49 \%$ |
| Total Alaska Odorized Propane | $\mathbf{4 1 , 4 2 0 , 0 0 0}$ | $\mathbf{0 . 4 8 \%}$ |
| Production |  |  |

## A. 5 Odorized Propane's Impact on Arizona Economy

| 2018 Odorized Propane Sales Breakout |  |  |
| :---: | :---: | :---: |
|  | (Gallons) | (\% of State) |
| Residential | 46,669,793 | 45.9\% |
| Commercial | 26,424,998 | 26.0\% |
| Cylinder | 7,854,104 | 7.7\% |
| Internal Combustion | 8,118,000 | 8.0\% |
| Industrial | 11,581,000 | 11.4\% |
| Agricultural | 1,112,000 | 1.1\% |
| Total Arizona Odorized Propane Demand | 101,759,894 | 100.0\% |
| Total Propane-Heated Households | 74,563 |  |
| Propane Share of Arizona Home He |  | 2.85\% |


| 2018 Employment |  |
| :--- | ---: |
|  |  |
| Production | 0 |
| Transportation, Storage, and Wholesale | 498 |
| Retail |  |
| Direct Arizona Employment Related to Odorized | $\mathbf{5 0 8}$ |

2018 Contribution to State Economy
(\$1,000)

| Total Market Value of Odorized Propane | $\mathbf{\$ 1 9 4 , 1 6 5}$ |
| :--- | ---: |
| Sold in Arizona (\$1,000) |  |
| Supply | $\$ 2$ |
| Transportation, Storage, and Wholesale | $\$ 8,828$ |
| Retail | $\$ 42,723$ |
|  | $\$ 51,553$ |
| Total Direct Value Added in Arizona | $\$ 245,157$ |
| Indirect and Induced | $\mathbf{\$ 2 9 6 , 7 1 0}$ |
| Total Odorized Propane Industry |  |
| Contribution to Arizona GDP |  |


| 2018 Labor Income |  |
| :--- | ---: |
|  | $(\$ 1,000)$ |
|  | $\$ 2$ |
| Production | $\$ 2,258$ |
| Transportation, Storage, and Wholesale | $\$ 28,692$ |
| Retail | $\$ 30,952$ |
| Direct Labor Income in Arizona <br> Odorized Propane Industry |  |


| 2018 Odorized Propane Production |  |  |
| :--- | :---: | :---: |
| (Gallons) | (\% of U.S. <br> Total) |  |
| Refineries |  |  |
| Gas Processing Plants | - | $0.00 \%$ |
| Total Arizona Odorized Propane |  |  |
| Production |  |  |

## A. 6 Odorized Propane's Impact on Arkansas Economy

| 2018 Odorized Propane Sales Breakout |  |  |
| :---: | :---: | :---: |
|  | (Gallons) | (\% of State) |
| Residential | 40,421,366 | 44.5\% |
| Commercial | 12,831,830 | 14.1\% |
| Cylinder | 3,236,813 | 3.6\% |
| Internal Combustion | 4,782,000 | 5.3\% |
| Industrial | 4,218,000 | 4.6\% |
| Agricultural | 25,376,000 | 27.9\% |
| Total Arkansas Odorized Propane Demand |  |  |
|  | 90,866,008 | 100.0\% |
| Total Propane-Heated Households | 82,510 |  |
| Propane Share of Arkansas Home Heating |  | 7.14\% |


| 2018 Employment |  |
| :--- | ---: |
|  |  |
| Production | 8 |
| Transportation, Storage, and Wholesale | 415 |
| Retail | 433 |
| Direct Arkansas Employment Related to | 433 |

2018 Contribution to State Economy
(\$1,000)

| Total Market Value of Odorized Propane | $\mathbf{\$ 1 7 5 , 4 2 7}$ |
| :--- | ---: |
| Sold in Arkansas (\$1,000) |  |
| Supply | $\$ 1,350$ |
| Transportation, Storage, and Wholesale | $\$ 8,494$ |
| Retail | $\$ 90,456$ |
|  |  |
| Total Direct Value Added in Arkansas | $\mathbf{\$ 1 0 0 , 3 0 0}$ |
| Indirect and Induced | $\$ 119,229$ |
| Total Odorized Propane Industry | $\mathbf{\$ 2 1 9 , 5 2 8}$ |
| Contribution to Arkansas GDP |  |


| 2018 Labor Income |  |
| :--- | ---: |
|  | $(\$ 1,000)$ |
|  | $\$ 884$ |
| Production | $\$ 783$ |
| Transportation, Storage, and Wholesale | $\$ 21,668$ |
| Retail | $\$ \mathbf{\$ 2 3 , 3 3 5}$ |
| Direct Labor Income in Arkansas |  |
| Odorized Propane Industry |  |


\left.| 2018 Odorized Propane Production |
| :--- | ---: | ---: |
| (\% of U.S. |
| Total) |$\right]$

## A. 7 Odorized Propane's Impact on California Economy

|  |  |  |
| :---: | :---: | :---: |
| 2018 Odorized Propane Sales Breakout |  |  |
| Residential | 217,844,454 | 41.8\% |
| Commercial | 136,994,351 | 26.3\% |
| Cylinder | 45,443,707 | 8.7\% |
| Internal Combustion | 46,069,000 | 8.8\% |
| Industrial | 23,885,000 | 4.6\% |
| Agricultural | 50,936,000 | 9.8\% |
| Total California Odorized Propane Demand |  |  |
|  | 521,172,512 | 100.0\% |
| Total Propane-Heated Households | 426,163 |  |
| Propane Share of California Home Heating |  | 3.26\% |


| 2018 Employment |  |
| :--- | ---: |
|  |  |
| Production | 267 |
| Transportation, Storage, and Wholesale | 54 |
| Retail | 2,425 |
| Direct California Employment Related to | 2,746 |
| Odorized Propane |  |

2018 Contribution to State Economy
(\$1,000)

| Total Market Value of Odorized Propane | $\mathbf{\$ 9 8 5 , 4 5 8}$ |
| :--- | ---: |
| Sold in California (\$1,000) |  |
| Supply | $\$ 42,898$ |
| Transportation, Storage, and Wholesale | $\$ 47,950$ |
| Retail | $\$ 209,756$ |
|  |  |
| Total Direct Value Added in California | $\$ 300,604$ |
| Indirect and Induced | $\$ 1,073,817$ |
| Total Odorized Propane Industry | $\mathbf{\$ 1 , 3 7 4 , 4 2 0}$ |
| Contribution to California GDP |  |


| 2018 Labor Income |  |
| :--- | ---: |
|  | $(\$ 1,000)$ |
|  |  |
| Production | $\$ 30,035$ |
| Transportation, Storage, and Wholesale | $\$ 4,359$ |
| Retail | $\$ 160,511$ |
| Direct Labor Income in California | $\$ 194,905$ |
| Odorized Propane Industry |  |


\left.| 2018 Odorized Propane Production |  |
| :--- | ---: |
| (\% of U.S. |  |
| Total) |  |$\right]$

## A. 8 Odorized Propane's Impact on Colorado Economy

| 2018 Odorized Propane Sales Breakout |  |  |
| :---: | :---: | :---: |
|  | (Gallons) | (\% of State) |
| Residential | 117,715,255 | 63.0\% |
| Commercial | 29,139,312 | 15.6\% |
| Cylinder | 9,195,837 | 4.9\% |
| Internal Combustion | 9,046,000 | 4.8\% |
| Industrial | 13,756,000 | 7.4\% |
| Agricultural | 7,926,000 | 4.2\% |
| Total Colorado Odorized Propane Demand |  |  |
|  | 186,778,404 | 100.0\% |
| Total Propane-Heated Households | 103,320 |  |
| Propane Share of Colorado Home Heating |  | 4.75\% |


| 2018 Employment |  |
| :--- | ---: |
|  |  |
| Production | 793 |
| Transportation, Storage, and Wholesale | 103 |
| Retail | 642 |
| Direct Colorado Employment Related to | $\mathbf{1 , 5 3 8}$ |

2018 Contribution to State Economy
(\$1,000)

| Total Market Value of Odorized Propane | $\mathbf{\$ 3 4 4 , 1 2 7}$ |
| :--- | ---: |
| Sold in Colorado (\$1,000) |  |
| Supply | $\$ 358,158$ |
| Transportation, Storage, and Wholesale | $\$ 37,428$ |
| Retail | $\$ 167,912$ |
|  |  |
| Total Direct Value Added in Colorado | $\$ 563,497$ |
| Indirect and Induced | $\$ 1,011,227$ |
| Total Odorized Propane Industry |  |
| Contribution to Colorado GDP | $\mathbf{\$ 1 , 5 7 4 , 7 2 4}$ |


| 2018 Labor Income |  |
| :--- | ---: |
|  | $(\$ 1,000)$ |
|  | $\$ 89,037$ |
| Production | $\$ 8,913$ |
| Transportation, Storage, and Wholesale | $\$ 38,571$ |
| Retail | $\mathbf{\$ 1 3 6 , 5 2 1}$ |
| Direct Labor Income in Colorado |  |
| Odorized Propane Industry |  |


\left.| 2018 Odorized Propane Production |
| :--- | ---: | ---: |
| (\% of U.S. |
| Total) |$\right]$

## A. 9 Odorized Propane's Impact on Connecticut Economy

| 2018 Odorized Propane Sales Breakout |  |  |
| :---: | :---: | :---: |
|  | (Gallons) | (\% of State) |
| Residential | 93,519,438 | 69.8\% |
| Commercial | 30,459,493 | 22.7\% |
| Cylinder | 3,406,005 | 2.5\% |
| Internal Combustion | 3,164,000 | 2.4\% |
| Industrial | 2,277,000 | 1.7\% |
| Agricultural | 1,230,000 | 0.9\% |
| Total Connecticut Odorized Propane Demand |  |  |
|  | 134,055,937 | 100.0\% |
| Total Propane-Heated Households | 60,526 |  |
| Propane Share of Connecticut Home Heating |  | 4.39\% |

2018 Employment

| Production | - |
| :--- | ---: |
| Transportation, Storage, and Wholesale | 11 |
| Retail | 1,099 |
| Direct Connecticut Employment Related to | $\mathbf{1 , 1 1 0}$ |
| Odorized Propane |  |

2018 Contribution to State Economy
(\$1,000)

| Total Market Value of Odorized Propane | $\mathbf{\$ 3 0 9 , 0 9 1}$ |
| :--- | ---: |
| Sold in Connecticut (\$1,000) |  |
| Supply | $\$ 0$ |
| Transportation, Storage, and Wholesale | $\$ 11,629$ |
| Retail | $\$ 82,279$ |
|  |  |
| Total Direct Value Added in Connecticut | $\$ 93,908$ |
| Indirect and Induced | $\$ 403,504$ |
| Total Odorized Propane Industry | $\$ 497,412$ |
| Contribution to Connecticut GDP |  |


| 2018 Labor Income |  |
| :--- | ---: |
|  | $(\$ 1,000)$ |
|  | $\$ 0$ |
| Production | $\$ 875$ |
| Transportation, Storage, and Wholesale | $\$ 95,979$ |
| Retail |  |
| Direct Labor Income in Connecticut | $\$ 96,854$ |
| Odorized Propane Industry |  |


| 2018 Odorized Propane Production |
| :--- | :---: |
| (\% of U.S. |
| Total) |$|$

## A. 10 Odorized Propane's Impact on Delaware Economy

| 2018 Odorized Propane Sales Breakout |
| :---: |
| (Gallons) (\% of State) |


|  |  |  |
| :--- | ---: | ---: |
|  | $30,493,413$ | $56.8 \%$ |
| Residential | $11,137,438$ | $20.7 \%$ |
| Commercial | 921,725 | $1.7 \%$ |
| Cylinder | $1,794,000$ | $3.3 \%$ |
| Internal Combustion | 950,000 | $1.8 \%$ |
| Industrial | $8,434,000$ | $15.7 \%$ |
| Agricultural |  |  |
| Total Delaware Odorized | $\mathbf{5 3 , 7 3 0 , 5 7 7}$ | $\mathbf{1 0 0 . 0 \%}$ |
| Propane Demand |  |  |
|  | $\mathbf{3 7 , 2 9 9}$ |  |
| Total Propane-Heated | $\mathbf{1 0 . 1 4 \%}$ |  |
| Households <br> Propane Share of Delaware Home Heating |  |  |

## 2018 Contribution to State Economy <br> 

| Total Market Value of Odorized Propane | $\mathbf{\$ 1 1 9 , 1 4 8}$ |
| :--- | ---: |
| Sold in Delaware (\$1,000) |  |
| Supply | $\$ 2,422$ |
| Transportation, Storage, and Wholesale | $\$ 5,094$ |
| Retail | $\$ 65,099$ |
|  |  |
| Total Direct Value Added in Delaware | $\$ 72,615$ |
| Indirect and Induced | $\$ 149,630$ |
| Total Odorized Propane Industry | $\mathbf{\$ 2 2 2 , 2 4 5}$ |
| Contribution to Delaware GDP |  |


| 2018 Employment |  |  |  |
| :--- | :--- | :--- | ---: | ---: |


\left.| 2018 Odorized Propane Production |
| :--- | :---: | :---: |
| (\% of U.S. |
| Total) |$\right]$


| Odorized Economy |  | on District of Columb |  |
| :---: | :---: | :---: | :---: |
| 2018 Odorized Propane Sales Breakout |  | 2018 Contribution to State Economy |  |
| (Gallons) | (\% of State) |  | $(\$ 1,000)$ |
| Residential 2,000 | 1.2\% | Total Market Value of Odorized Propane Sold in District of Columbia (\$1,000) | \$9,016 |
| Commercial 9,705 | 5.7\% |  |  |
| Cylinder 47,000 | 27.7\% | Supply | \$0 |
| Internal Combustion 1,000 | 0.6\% | Transportation, Storage, and Wholesale | \$344 |
| Industrial 110,000 | 64.8\% | Retail | \$5,025 |
| Agricultural | 0.0\% |  |  |
| Total District of Columbia  <br> Odorized Propane Demand 169,705 | 100.0\% | Total Direct Value Added in District of Columbia | \$5,369 |
|  |  | Indirect and Induced | \$90,867 |
| Total Propane-Heated Households |  | Contribution to District of Columbia GDP | \$96,236 |
| Propane Share of District of Columbia Home | 1.05\% |  |  |
| 2018 Employment |  | 2018 Labor Income |  |
|  |  |  | (\$1,000) |
| Production | - | Production | \$0 |
| Transportation, Storage, and Wholesale | 1 | Transportation, Storage, and Wholesale | \$26 |
| Retail | 49 | Retail | \$1,053 |
| Direct District of Columbia Employment Related to Odorized Propane | 50 | Direct Labor Income in District of Columbia Odorized Propane Industry | \$1,079 |

2018 Odorized Propane Production

|  | (Gallons) | (\% of U.S. <br> Total) |
| :--- | :---: | :---: |
| Refineries | - | $0.00 \%$ |
| Gas Processing Plants | - | $0.00 \%$ |
| Total District of Columbia |  |  |
| Odorized Propane Production | - | $\mathbf{0 . 0 0 \%}$ |

## 2018 Labor Income

Direct Labor Income in District of Columbia Odorized Propane Industry
\$1,079

## A. 12 Odorized Propane's Impact on Florida Economy

2018 Odorized Propane Sales Breakout

2018 Contribution to State Economy
Total Market Value of Odorized Propane $\$ 402,407$
Sold in Florida $(\$ 1,000)$

| Supply | $\$ 720$ |
| :--- | ---: |
| Transportation, Storage, and Wholesale | $\$ 18,820$ |
| Retail | $\$ 181,760$ |
|  |  |
| Total Direct Value Added in Florida | $\mathbf{\$ 2 0 1 , 2 9 9}$ |
| Indirect and Induced | $\$ 570,070$ |
| Total Odorized Propane Industry <br> Contribution to Florida GDP | $\mathbf{\$ 7 7 1 , 3 6 9}$ |


| Total Propane-Heated | $\mathbf{6 3 , 3 9 5}$ |  |
| :--- | ---: | ---: |
| Households |  | $0.81 \%$ |
| Propane Share of Florida Home Heating |  |  |


| 2018 Employment |  |
| :--- | ---: |
|  |  |
| Production | 3 |
| Transportation, Storage, and Wholesale | 18 |
| Retail | 1,603 |
| Direct Florida Employment Related to Odorized <br> Propane | $\mathbf{1 , 6 2 4}$ |


| 2018 Labor Income |  |
| :--- | ---: |
|  | $(\$ 1,000)$ |
|  |  |
| Production | $\$ 360$ |
| Transportation, Storage, and Wholesale | $\$ 1,421$ |
| Retail | $\$ 97,908$ |
|  |  |


| 2018 Odorized Propane Production |  |  |
| :--- | :---: | :---: |
|  | (Gallons) | (\% of U.S. <br> Total) |
| Refineries |  |  |
| Gas Processing Plants | - | $0.00 \%$ |
| Total Florida Odorized Propane <br> Production | 673,000 | $0.01 \%$ |
|  | $\mathbf{6 7 3 , 0 0 0}$ | $\mathbf{0 . 0 1 \%}$ |



| 2018 Odorized Propane Production |  |  |
| :--- | :---: | :---: |
| (Gallons) | (\% of U.S. <br> Total) |  |
| Refineries | - | $0.00 \%$ |
| Gas Processing Plants | - | $0.00 \%$ |
| Total Georgia Odorized Propane |  |  |
| Production |  |  |

## 2018 Odorized Propane Sales Breakout <br> (Gallons) (\% of State)

A. 14 Odorized Propane's Impact on Hawaii Economy

|  |  |  |
| :--- | ---: | ---: |
| Residential | $4,462,701$ | $11.0 \%$ |
| Commercial | $31,083,965$ | $76.7 \%$ |
| Cylinder | 515,809 | $1.3 \%$ |
| Internal Combustion | 146,000 | $0.4 \%$ |
| Industrial | $4,315,000$ | $10.6 \%$ |
| Agricultural | - | $0.0 \%$ |

Total Hawaii Odorized Propane Demand

| Total Propane-Heated | $\mathbf{7 , 3 7 0}$ |  |
| :--- | :--- | :--- |
| Households |  | $1.62 \%$ |


| 2018 Employment |  |
| :--- | ---: |
|  |  |
| Production | 1 |
| Transportation, Storage, and Wholesale | 4 |
| Retail | 58 |
| Direct Hawaii Employment Related to Odorized | 63 |

## 2018 Odorized Propane Production

| 2018 Odorized Propane Production |  |  |
| :--- | :---: | :---: |
|  | (Gallons) | (\% of U.S. <br> Total) |
| Refineries | $5,470,000$ | $0.37 \%$ |
| Gas Processing Plants | - | $0.00 \%$ |
| Total Hawaii Odorized Propane | $\mathbf{5 , 4 7 0 , 0 0 0}$ | $\mathbf{0 . 0 6 \%}$ |
| Production |  |  |

2018 Contribution to State Economy
(\$1,000)

| Total Market Value of Odorized Propane | $\mathbf{\$ 7 1 , 5 4 9}$ |
| :--- | ---: |
| Sold in Hawaii (\$1,000) | $\$ 0$ |
| Supply | $\$ 3,677$ |
| Transportation, Storage, and Wholesale | $\$ 11,192$ |
| Retail |  |
|  | $\$ 14,868$ |
| Total Direct Value Added in Hawaii | $\$ 303,842$ |
| Indirect and Induced | $\$ 318,711$ |
| Total Odorized Propane Industry |  |
| Contribution to Hawaii GDP |  |


| 2018 |  |
| :--- | ---: |
|  | $(\$ 1,000)$ |
|  | $\$ 83$ |
| Production | $\$ 311$ |
| Transportation, Storage, and Wholesale | $\$ 7,680$ |
| Retail |  |
| Direct Labor Income in Hawaii Odorized | $\mathbf{\$ 8 , 0 7 4}$ |

A. 15 Odorized Propane's Impact on Idaho Economy

## 2018 Odorized Propane Sales Breakout <br> (Gallons) (\% of State)

|  |  |  |
| :--- | ---: | ---: |
| Residential | $40,466,253$ | $60.4 \%$ |
| Commercial | $16,771,052$ | $25.1 \%$ |
| Cylinder | $1,611,952$ | $2.4 \%$ |
| Internal Combustion | $1,114,000$ | $1.7 \%$ |
| Industrial | $1,916,000$ | $2.9 \%$ |
| Agricultural | $5,065,000$ | $7.6 \%$ |


| Total Idaho Odorized Propane | $\mathbf{6 6 , 9 4 4 , 2 5 8}$ | $\mathbf{1 0 0 . 0 \%}$ |
| :--- | :---: | :---: |
| Demand |  |  |
| Total Propane-Heated | $\mathbf{3 1 , 1 6 2}$ |  |
| Households <br> Propane Share of Idaho Home Heating |  | $4.87 \%$ |


| 2018 Employment |  |
| :--- | ---: |
|  |  |
| Production | 1 |
| Transportation, Storage, and Wholesale | 6 |
| Retail | 180 |
| Direct Idaho Employment Related to Odorized <br> Propane | $\mathbf{1 8 6}$ |

2018 Contribution to State Economy
(\$1,000)

| Total Market Value of Odorized Propane | $\mathbf{\$ 1 2 3 , 1 3 5}$ |
| :--- | ---: |
| Sold in Idaho (\$1,000) |  |
| Supply | $\$ 300$ |
| Transportation, Storage, and Wholesale | $\$ 5,815$ |
| Retail | $\$ 59,975$ |
|  | $\$ \mathbf{\$ 6 6 , 0 9 0}$ |
| Total Direct Value Added in Idaho | $\$ 339,921$ |
| Indirect and Induced | $\mathbf{\$ 4 0 6 , 0 1 1}$ |
| Total Odorized Propane Industry <br> Contribution to Idaho GDP |  |


| 2018 Labor Income |  |
| :--- | ---: |
|  | $(\$ 1,000)$ |
|  | $\$ 59$ |
| Production | $\$ 440$ |
| Transportation, Storage, and Wholesale | $\$ 8,849$ |
| Retail |  |
| Direct Labor Income in Idaho Odorized | $\$ 9,348$ |


| 2018 Odorized Propane Production |  |  |
| :--- | :---: | :---: |
|  | (Gallons) of U.S. <br> Total) |  |
| Refineries | - |  |
| Gas Processing Plants | 553,000 |  |

## 2018 Odorized Propane Sales Breakout <br> (Gallons) (\% of State)

A. 16 Odorized Propane's Impact on Illinois Economy

|  |  |  |
| :--- | ---: | ---: |
| Residential | $233,158,193$ | $60.5 \%$ |
| Commercial | $38,186,531$ | $9.9 \%$ |
| Cylinder | $10,528,437$ | $2.7 \%$ |
| Internal Combustion | $34,544,000$ | $9.0 \%$ |
| Industrial | $12,762,000$ | $3.3 \%$ |
| Agricultural | $56,418,000$ | $14.6 \%$ |


| Total Illinois Odorized Propane | 385,597,162 | $\mathbf{1 0 0 . 0 \%}$ |
| :--- | ---: | ---: |
| Demand |  |  |
| Total Propane-Heated | 201,831 |  |
| Households <br> Propane Share of Illinois Home Heating |  | $4.15 \%$ |


| 2018 Employment |  |
| :--- | ---: |
|  |  |
| Production | 52 |
| Transportation, Storage, and Wholesale | 58 |
| Retail | 976 |
| Direct Illinois Employment Related to Odorized | $\mathbf{1 , 0 8 5}$ |

2018 Contribution to State Economy
(\$1,000)
Total Market Value of Odorized Propane $\$ \mathbf{\$ 6 6 7 , 5 9 5}$
Sold in Illinois $\mathbf{( \$ 1 , 0 0 0 )}$

| Supply | $-\$ 33,238$ |
| :--- | ---: |
| Transportation, Storage, and Wholesale | $\$ 50,528$ |
| Retail | $\$ 659,787$ |


| Total Direct Value Added in Illinois | $\mathbf{\$ 6 7 7 , 0 7 6}$ |
| :--- | ---: |
| Indirect and Induced | $\$ 1,156,225$ |
| Total Odorized Propane Industry | $\mathbf{\$ 1 , 8 3 3 , 3 0 1}$ |
| Contribution to Illinois GDP |  |


| 2018 Labor Income |  |
| :--- | ---: |
|  |  |
|  | $(\$ 1,000)$ |
| Production | $\$ 5,984$ |
| Transportation, Storage, and Wholesale | $\$ 4,784$ |
| Retail | $\$ 53,814$ |
| Direct Labor Income in Illinois Odorized |  |
| Propane Industry | $\$ 64,582$ |


\left.| 2018 Odorized Propane Production |  |
| :--- | :---: |
|  | (Gallons) |
| (\% of U.S. |  |
| Total) |  |$\right\}$

## 2018 Odorized Propane Sales Breakout <br> (Gallons) (\% of State)

A. 17 Odorized Propane's Impact on Indiana Economy

|  |  |  |
| :--- | ---: | ---: |
| Residential | $139,903,632$ | $60.1 \%$ |
| Commercial | $35,168,126$ | $15.1 \%$ |
| Cylinder | $7,942,604$ | $3.4 \%$ |
| Internal Combustion | $16,985,000$ | $7.3 \%$ |
| Industrial | $5,724,000$ | $2.5 \%$ |
| Agricultural | $27,169,000$ | $11.7 \%$ |


| Total Indiana Odorized Propane | $\mathbf{2 3 2 , 8 9 2 , 3 6 2}$ | $\mathbf{1 0 0 . 0 \%}$ |
| :--- | ---: | ---: |
| Demand |  |  |
| Total Propane-Heated | $\mathbf{1 8 4 , 2 6 5}$ |  |
| Households <br> Propane Share of Indiana Home Heating |  | $7.09 \%$ |

2018 Contribution to State Economy

| Total Market Value of Odorized Propane | $\mathbf{\$ 4 0 2 , 8 8 9}$ |
| :--- | ---: |
| Sold in Indiana (\$1,000) |  |
| Supply | $\$ 329$ |
| Transportation, Storage, and Wholesale | $\$ 30,920$ |
| Retail | $\$ 398,171$ |
|  |  |
| Total Direct Value Added in Indiana | $\mathbf{\$ 4 2 9 , 4 2 0}$ |
| Indirect and Induced | $\$ 752,536$ |
| Total Odorized Propane Industry <br> Contribution to Indiana GDP | $\mathbf{\$ 1 , 1 8 1 , 9 5 6}$ |


| 2018 Employment |  | 2018 Labor Income |  |
| :---: | :---: | :---: | :---: |
|  |  |  | (\$1,000) |
| Production | 5 | Production | \$675 |
| Transportation, Storage, and Wholesale | 58 | Transportation, Storage, and Wholesale | \$4,744 |
| Retail | 1,137 | Retail | \$64,887 |
| Direct Indiana Employment Related to Odorized Propane | 1,200 | Direct Labor Income in Indiana Odorized Propane Industry | \$70,306 |


| 2018 Odorized Propane Production |  |  |
| :--- | :---: | :---: |
|  | (Gollons) of U.S. <br> Total) |  |
| Refineries | $35,309,000$ | $2.38 \%$ |
| Gas Processing Plants | - | $0.00 \%$ |
| Total Indiana Odorized Propane <br> Production | $\mathbf{3 5 , 3 0 9 , 0 0 0}$ | $\mathbf{0 . 4 1 \%}$ |

A. 18 Odorized Propane's Impact on lowa Economy

## 2018 Odorized Propane Sales Breakout <br> (Gallons) (\% of State)

|  |  |  |
| :--- | ---: | ---: |
| Residential | $240,850,806$ | $51.8 \%$ |
| Commercial | $39,130,849$ | $8.4 \%$ |
| Cylinder | $6,758,726$ | $1.5 \%$ |
| Internal Combustion | $11,149,000$ | $2.4 \%$ |
| Industrial | $6,666,000$ | $1.4 \%$ |
| Agricultural | $160,101,000$ | $34.5 \%$ |

Total lowa Odorized Propane Demand

| Total Propane-Heated | $\mathbf{1 6 5 , 4 8 4}$ |  |
| :--- | :---: | ---: |
| Households |  | $13.05 \%$ |

2018 Employment

| Production | - |
| :--- | :---: |
| Transportation, Storage, and Wholesale | $(2)$ |
| Retail | 471 |
| Direct lowa Employment Related to Odorized <br> Propane | $\mathbf{4 6 8}$ |

2018 Contribution to State Economy
$(\$ 1,000)$
Total Market Value of Odorized Propane $\$ 797,439$
Sold in lowa (\$1,000)

| Supply | $\$ 0$ |
| :--- | ---: |
| Transportation, Storage, and Wholesale | $\$ 41,159$ |

Retail \$787,969

| Total Direct Value Added in lowa | $\mathbf{\$ 8 2 9 , 1 2 8}$ |
| :--- | ---: |
| Indirect and Induced | $\$ 1,109, \mathbf{3 2 5}$ |
| Total Odorized Propane Industry | $\mathbf{\$ 1 , 9 3 8 , 4 5 3}$ |
| Contribution to lowa GDP |  |


| 2018 Labor Income |  |
| :--- | ---: |
|  | $(\$ 1,000)$ |
|  | $\$ 0$ |
| Production | $-\$ 188$ |
| Transportation, Storage, and Wholesale | $\$ 23,699$ |
| Retail |  |
| Direct Labor Income in lowa Odorized <br> Propane Industry | $\mathbf{\$ 2 3 , 5 1 1}$ |

## 2018 Odorized Propane Production

|  | (Gallons) | (\% of U.S. <br> Total) |
| :---: | :---: | :---: |
| Refineries | - | $0.00 \%$ |
| Gas Processing Plants | - | $0.00 \%$ |
| Total lowa Odorized Propane | - | $\mathbf{0 . 0 0 \%}$ |
| Production |  |  |

## 2018 Odorized Propane Sales Breakout <br> (Gallons) (\% of State)

A. 19 Odorized Propane's Impact on Kansas Economy

|  |  |  |
| :--- | ---: | ---: |
| Residential | $88,423,188$ | $71.3 \%$ |
| Commercial | $9,459,978$ | $7.6 \%$ |
| Cylinder | $3,656,546$ | $2.9 \%$ |
| Internal Combustion | $9,656,000$ | $7.8 \%$ |
| Industrial | $7,361,000$ | $5.9 \%$ |
| Agricultural | $5,435,000$ | $4.4 \%$ |


| Total Kansas Odorized Propane | $\mathbf{1 2 3 , 9 9 1 , 7 1 2}$ | $\mathbf{1 0 0 . 0 \%}$ |
| :--- | ---: | ---: |
| Demand |  |  |
| Total Propane-Heated | $\mathbf{8 9 , 2 7 2}$ |  |
| Households <br> Propane Share of Kansas Home Heating |  | $\mathbf{7 . 8 8 \%}$ |


| 2018 Employment |  |
| :--- | :--- |
|  |  |
| Production | 129 |
| Transportation, Storage, and Wholesale | 137 |
| Retail | 311 |
| Direct Kansas Employment Related to Odorized | 577 |
| Propane |  |

2018 Contribution to State Economy
(\$1,000)
Total Market Value of Odorized Propane $\$ 217,059$
Sold in Kansas $\mathbf{( \$ 1 , 0 0 0 )}$

| Supply | $\$ 64,282$ |
| :--- | ---: |
| Transportation, Storage, and Wholesale | $\$ 44,827$ |
| Retail | $\$ 214,568$ |


| Total Direct Value Added in Kansas | \$323,677 |
| :---: | :---: |
| Indirect and Induced | \$690,700 |
| Total Odorized Propane Industry Contribution to Kansas GDP | \$1,014,377 |


| 2018 Labor Income |  |
| :--- | ---: |
|  | $(\$ 1,000)$ |
|  | $\$ 14,506$ |
| Production | $\$ 11,284$ |
| Transportation, Storage, and Wholesale | $\$ 16,092$ |
| Retail | $\$ 41,882$ |
| Direct Labor Income in Kansas |  |
| Odorized Propane Industry |  |


| 2018 Odorized Propane Production |  |  |
| :--- | ---: | ---: |
|  | (Gallons) | (\% of U.S. <br> Total) |
| Refineries |  |  |
| Gas Processing Plants | $24,085,000$ | $1.62 \%$ |
| Total Kansas Odorized Propane | $91,203,000$ | $1.28 \%$ |
| Production | $\mathbf{1 1 5 , 2 8 8 , 0 0 0}$ | $\mathbf{1 . 3 4 \%}$ |

## A. 20 Odorized Propane's Impact on Kentucky Economy

2018 Odorized Propane Sales Breakout

| Residential | 61,492,485 | 58.3\% |
| :---: | :---: | :---: |
| Commercial | 21,032,273 | 19.9\% |
| Cylinder | 3,290,788 | 3.1\% |
| Internal Combustion | 9,556,000 | 9.1\% |
| Industrial | 4,683,000 | 4.4\% |
| Agricultural | 5,444,000 | 5.2\% |
| Total Kentucky Odorized Propane Demand | 105,498,546 | 100.0\% |
| Total Propane-Heated Households | 110,523 |  |
| Propane Share of Kentucky | ating | 6.38\% |

## 2018 Contribution to State Economy <br> 

| Total Market Value of Odorized Propane | $\mathbf{\$ 1 8 2 , 4 0 5}$ |
| :--- | ---: |
| Sold in Kentucky (\$1,000) |  |
| Supply | $\$ 8,515$ |
| Transportation, Storage, and Wholesale | $\$ 10,017$ |
| Retail | $\$ 180,266$ |
|  |  |
| Total Direct Value Added in Kentucky | $\mathbf{\$ 1 9 8 , 7 9 9}$ |
| Indirect and Induced | $\$ 504,162$ |
| Total Odorized Propane Industry <br> Contribution to Kentucky GDP | $\$ 702,961$ |


| 2018 Employment |  | 2018 Labor Income |  |
| :---: | :---: | :---: | :---: |
|  |  |  | (\$1,000) |
| Production | 19 | Production | \$2,148 |
| Transportation, Storage, and Wholesale | 12 | Transportation, Storage, and Wholesale | \$972 |
| Retail | 512 | Retail | \$27,703 |
| Direct Kentucky Employment Related to Odorized Propane | 543 | Direct Labor Income in Kentucky Odorized Propane Industry | \$30,822 |


\left.| 2018 Odorized Propane Production |  |
| :--- | :--- | :--- |
| (\% of U.S. |  |
| Total) |  |$\right]$

## A. 21 Odorized Propane's Impact on Louisiana Economy

2018 Odorized Propane Sales Breakout
(Gallons) (\% of State)

|  |  |  |
| :--- | ---: | ---: |
| Residential | $14,866,442$ | $29.8 \%$ |
| Commercial | $12,107,780$ | $24.3 \%$ |
| Cylinder | $4,249,622$ | $8.5 \%$ |
| Internal Combustion | $5,060,000$ | $10.1 \%$ |
| Industrial | $3,022,000$ | $6.1 \%$ |
| Agricultural | $10,600,000$ | $21.2 \%$ |


| Total Louisiana Odorized | $\mathbf{4 9 , 9 0 5 , 8 4 4}$ | $\mathbf{1 0 0 . 0 \%}$ |
| :--- | ---: | ---: |
| Propane Demand |  |  |
| Total Propane-Heated <br> Households <br> Propane Share of Louisiana Home Heating | $\mathbf{3 0 , 3 6 7}$ |  |

2018 Contribution to State Economy


| Total Market Value of Odorized Propane | $\mathbf{\$ 9 3 , 7 4 3}$ |
| :--- | ---: |
| Sold in Louisiana (\$1,000) |  |
| Supply | $\$ 256,217$ |
| Transportation, Storage, and Wholesale | $\$ 18,827$ |
| Retail | $\$ 47,052$ |
|  |  |
| Total Direct Value Added in Louisiana | $\mathbf{\$ 3 2 2 , 0 9 6}$ |
| Indirect and Induced | $\$ 590,939$ |
| Total Odorized Propane Industry <br> Contribution to Louisiana GDP | $\mathbf{\$ 9 1 3 , 0 3 5}$ |


| 2018 Labor Income |  |
| :--- | ---: |
|  |  |
|  | $\mathbf{( \$ 1 , 0 0 0 )}$ |
| Production | $\$ 35,793$ |
| Transportation, Storage, and Wholesale | $\$ 4,663$ |
| Retail | $\$ 17,367$ |
| Direct Labor Income in Louisiana | $\$ 57,823$ |


\left.| 2018 Odorized Propane Production |
| :--- | ---: | ---: |
| (\% of U.S. |
| Total) |$\right]$

A. 22 Odorized Propane's Impact on Maine Economy

## 2018 Odorized Propane Sales Breakout <br> (Gallons) (\% of State)

|  |  |  |
| :--- | ---: | ---: |
| Residential | $82,868,772$ | $50.0 \%$ |
| Commercial | $75,979,697$ | $45.9 \%$ |
| Cylinder | $2,711,767$ | $1.6 \%$ |
| Internal Combustion | 890,000 | $0.5 \%$ |
| Industrial | $2,603,000$ | $1.6 \%$ |
| Agricultural | 529,000 | $0.3 \%$ |


| Total Maine Odorized Propane | $165,582,236$ | $100.0 \%$ |
| :--- | :--- | :--- |
| Demand |  |  |


| Total Propane-Heated | $\mathbf{6 1 , 1 9 4}$ |  |
| :--- | :---: | :---: |
| Households |  | $10.73 \%$ |


| 2018 Employment |  |
| :--- | ---: |
|  |  |
| Production | - |
| Transportation, Storage, and Wholesale | 14 |
| Retail | 1,074 |
| Direct Maine Employment Related to Odorized <br> Propane | $\mathbf{1 , 0 8 8}$ |

2018 Contribution to State Economy
(\$1,000)
Total Market Value of Odorized Propane $\$ 354,259$
Sold in Maine $(\$ 1,000)$

| Supply | $\$ 0$ |
| :--- | ---: |
| Transportation, Storage, and Wholesale | $\$ 14,364$ |

Retail \$73,874

|  |  |
| :--- | ---: |
| Total Direct Value Added in Maine | $\mathbf{\$ 8 8 , 2 3 8}$ |
| Indirect and Induced | $\$ 507,974$ |
| Total Odorized Propane Industry | $\$ 596, \mathbf{2 1 2}$ |
| Contribution to Maine GDP |  |


| 2018 Labor Income |  |
| :--- | ---: |
|  | $(\$ 1,000)$ |
|  | $\$ 0$ |
| Production | $\$ 1,081$ |
| Transportation, Storage, and Wholesale | $\$ 61,719$ |
| Retail |  |
| Direct Labor Income in Maine Odorized <br> Propane Industry | $\$ 62,800$ |


| 2018 Odorized Propane Production |  |  |
| :--- | :---: | :---: |
|  | (Gallons) of U.S. <br> Total) |  |
| Refineries | - | $0.00 \%$ |
| Gas Processing Plants | - | $0.00 \%$ |
| Total Maine Odorized Propane |  |  |
| Production | - | $\mathbf{0 . 0 0 \%}$ |

## A. 23 Odorized Propane's Impact on Maryland Economy

| 2018 Odorized Propane Sales Breakout |
| :---: |
| (Gallons) (\% of State) |


|  |  |  |
| :--- | ---: | ---: |
| Residential | $71,409,000$ | $56.0 \%$ |
| Commercial | $28,764,220$ | $22.6 \%$ |
| Cylinder | $6,632,000$ | $5.2 \%$ |
| Internal Combustion | $4,447,000$ | $3.5 \%$ |
| Industrial | $4,243,000$ | $3.3 \%$ |
| Agricultural | $12,059,000$ | $9.5 \%$ |


| Total Maryland Odorized <br> Propane Demand | $\mathbf{1 2 7 , 5 5 4 , 2 2 0}$ | $\mathbf{1 0 0 . 0 \%}$ |
| :--- | ---: | ---: |
| Total Propane-Heated <br> Households <br> Propane Share of Maryland Home Heating | $\mathbf{8 0 , 7 5 4}$ |  |

2018 Employment

| Production | - |
| :--- | ---: |
| Transportation, Storage, and Wholesale | 10 |
| Retail | 1,008 |
| Direct Maryland Employment Related to | $\mathbf{1 , 0 1 8}$ |
| Odorized Propane |  |


| 2018 Odorized Propane Production |
| :--- | :---: | :---: |
| (\% of U.S. |
| Total) |$|$| (Gallons) | - | $0.00 \%$ |
| :--- | :--- | :--- |
| Refineries | - | $0.00 \%$ |
| Gas Processing Plants | - | $\mathbf{0 . 0 0 \%}$ |
| Total Maryland Odorized |  |  |
| Propane Production |  |  |

2018 Contribution to State Economy
(\$1,000)

| Total Market Value of Odorized Propane | $\mathbf{\$ 2 7 3 , 3 8 4}$ |
| :--- | ---: |
| Sold in Maryland (\$1,000) | $\$ 0$ |
| Supply | $\$ 10,735$ |
| Transportation, Storage, and Wholesale | $\$ 148,889$ |
| Retail |  |
|  | $\$ 159,625$ |
| Total Direct Value Added in Maryland | $\$ 634,705$ |
| Indirect and Induced | $\mathbf{\$ 7 9 4 , 3 3 0}$ |
| Total Odorized Propane Industry <br> Contribution to Maryland GDP |  |


| 2018 Labor Income |  |
| :--- | ---: |
|  | $(\$ 1,000)$ |
|  | $\$ 0$ |
| Production | $\$ 808$ |
| Transportation, Storage, and Wholesale | $\$ 80,063$ |
| Retail |  |
| Direct Labor Income in Maryland | $\$ 80,871$ |
| Odorized Propane Industry |  |



2018 Odorized Propane Production

|  | (Gallons) | (\% of U.S. <br> Total) |
| :--- | :---: | :---: |
| Refineries | - | $0.00 \%$ |
| Gas Processing Plants | - | $0.00 \%$ |
| Total Massachusetts Odorized |  |  |
| Propane Production | - | $\mathbf{0 . 0 0 \%}$ |

## A. 25 Odorized Propane's Impact on Michigan Economy

2018 Odorized Propane Sales Breakout
(Gallons) (\% of State)

| Residential | 453,302,283 | 79.7\% |
| :---: | :---: | :---: |
| Commercial | 48,229,084 | 8.5\% |
| Cylinder | 13,287,456 | 2.3\% |
| Internal Combustion | 25,275,000 | 4.4\% |
| Industrial | 5,456,000 | 1.0\% |
| Agricultural | 23,495,000 | 4.1\% |
| Total Michigan Odorized Propane Demand | 569,044,823 | 100.0\% |
| Total Propane-Heated Households | 332,085 |  |
| Propane Share of Michigan | ating | 8.39\% |

2018 Contribution to State Economy
$(\$ 1,000)$

| Total Market Value of Odorized Propane | $\mathbf{\$ 1 , 0 0 0 , 9 6 5}$ |
| :--- | ---: |
| Sold in Michigan (\$1,000) |  |
| Supply | $\$ 3,299$ |
| Transportation, Storage, and Wholesale | $\$ 50,597$ |
| Retail | $\$ 989,576$ |
|  |  |
|  | $\mathbf{\$ 1 , 0 4 3 , 4 7 3}$ |
| Total Direct Value Added in Michigan | $\$ 1,970,636$ |
| Indirect and Induced | $\mathbf{\$ 3 , 0 1 4 , 1 0 9}$ |
| Total Odorized Propane Industry |  |
| Contribution to Michigan GDP |  |


| 2018 Employment |  | 2018 Labor Income |  |
| :---: | :---: | :---: | :---: |
|  |  |  | (\$1,000) |
| Production | 12 | Production | \$1,403 |
| Transportation, Storage, and Wholesale | 51 | Transportation, Storage, and Wholesale | \$4,094 |
| Retail | 1,541 | Retail | \$98,331 |
| Direct Michigan Employment Related to Odorized Propane | 1,604 | Direct Labor Income in Michigan Odorized Propane Industry | \$103,829 |


| 2018 Odorized Propane Production |  |  |
| :---: | :---: | :---: |
|  | (Gallons) | $\begin{gathered} \text { (\% of U.S. } \\ \text { Total) } \end{gathered}$ |
| Refineries | 10,494,000 | 0.71\% |
| Gas Processing Plants | 5,026,000 | 0.07\% |
| Total Michigan Odorized Propane Production | 15,520,000 | 0.18\% |

## A. 26 Odorized Propane's Impact on Minnesota Economy

2018 Odorized Propane Sales Breakout

|  |  |  |
| :--- | ---: | ---: |
|  | $299,198,933$ | $60.1 \%$ |
| Residential | $68,139,820$ | $13.7 \%$ |
| Commercial | $7,996,007$ | $1.6 \%$ |
| Cylinder | $5,165,000$ | $1.0 \%$ |
| Internal Combustion | $5,721,000$ | $1.1 \%$ |
| Industrial | $111,575,000$ | $22.4 \%$ |
| Agricultural |  |  |
| Total Minnesota Odorized | $\mathbf{4 9 7 , 7 9 5 , 7 5 9}$ | $\mathbf{1 0 0 . 0 \%}$ |
| Propane Demand |  |  |
| $\mathbf{2 3 7 , 1 9 0}$ |  |  |


| 2018 Employment |  | 2018 Labor Income |  |
| :---: | :---: | :---: | :---: |
|  |  |  | \$1,000) |
| Production | 2 | Production | \$295 |
| Transportation, Storage, and Wholesale | 47 | Transportation, Storage, and Wholesale | \$3,723 |
| Retail | 1,140 | Retail | \$65,171 |
| Direct Minnesota Employment Related to Odorized Propane | 1,189 | Direct Labor Income in Minnesota Odorized Propane Industry | \$69,188 |


| 2018 Odorized Propane Production |  |  |
| :--- | :---: | :---: |
|  | (Gallons) of U.S. <br> Total) |  |
| Refineries | $25,608,000$ | - |

2018 Contribution to State Economy
Total Market Value of Odorized Propane $\quad \$ 860,587$
Sold in Minnesota $\mathbf{( \$ 1 , 0 0 0 )}$

Sold in Minnesota $(\$ 1,000)$
\$0
Transportation, Storage, and Wholesale $\$ 44,789$

Retail \$850,496

| Total Direct Value Added in Minnesota | $\mathbf{\$ 8 9 5 , 2 8 4}$ |
| :--- | ---: |
| Indirect and Induced | $\$ 1,617,032$ |
| Total Odorized Propane Industry | $\mathbf{\$ 2 , 5 1 2 , 3 1 7}$ |
| Contribution to Minnesota GDP |  | Odorized Propane Industry

## A. 27 Odorized Propane's Impact on Mississippi Economy

2018 Odorized Propane Sales Breakout
(Gallons) (\% of State)

2018 Contribution to State Economy


| Total Market Value of Odorized Propane | $\mathbf{\$ 2 1 4 , 8 4 5}$ |
| :--- | ---: |
| Sold in Mississippi (\$1,000) |  |
| Supply | $\$ 34,311$ |
| Transportation, Storage, and Wholesale | $\$ 11,489$ |
| Retail | $\$ 112,451$ |
|  | $\mathbf{\$ 1 5 8 , 2 5 1}$ |
| Total Direct Value Added in Mississippi | $\$ 515,975$ |
| Indirect and Induced | $\mathbf{\$ 6 7 4 , 2 2 6}$ |
| Total Odorized Propane Industry <br> Contribution to Mississippi GDP |  |


| 2018 Labor Income |  |
| :--- | ---: |
|  | $(\$ 1,000)$ |
|  |  |
| Production | $\$ 7,852$ |
| Transportation, Storage, and Wholesale | $\$ 1,403$ |
| Retail | $\$ 34,344$ |
| Direct Labor Income in Mississippi | $\$ \mathbf{\$ 4 3 , 5 9 9}$ |


| 2018 Odorized Propane Production |  |  |
| :--- | :---: | :---: |
| (Gallons) | of U.S. <br> Total) |  |
| Refineries | $35,966,000$ | $2.42 \%$ |
| Gas Processing Plants | $52,118,000$ | $0.73 \%$ |
| Total Mississippi Odorized | $\mathbf{8 8 , 0 8 4 , 0 0 0}$ | $\mathbf{1 . 0 2 \%}$ |
| Propane Production |  |  |

A. 28 Odorized Propane's Impact on Missouri Economy
2018 Odorized Propane Sales Breakout
(Gallons) (\% of State)

2018 Contribution to State Economy
$(\$ 1,000)$

| Total Market Value of Odorized Propane | $\$ 497,512$ |
| :--- | ---: |
| Sold in Missouri (\$1,000) | $\$ 18$ |
| Supply | $\$ 30,161$ |
| Transportation, Storage, and Wholesale |  |
| Retail | $\$ 491,690$ |
|  | $\$ 521,869$ |
| Total Direct Value Added in Missouri | $\$ 1,316,835$ |
| Indirect and Induced | $\$ 1,838,703$ |
| Total Odorized Propane Industry |  |
| Contribution to Missouri GDP |  |


| 2018 Labor Income |  |
| :--- | ---: |
|  | $(\$ 1,000)$ |
|  | $\$ 14$ |
| Production | $\$ 3,456$ |
| Transportation, Storage, and Wholesale | $\$ 75,543$ |
| Retail |  |
| Direct Labor Income in Missouri | $\$ 79,013$ |
| Odorized Propane Industry |  |

\$79,013

| 2018 Odorized Propane Production |  |  |
| :--- | :---: | :---: |
|  | (Gallons) of U.S. <br> Total) |  |
| Refineries |  |  |
| Gas Processing Plants | - | $0.00 \%$ |
| Total Missouri Odorized Propane | - | $0.00 \%$ |
| Production |  |  |


| Odorized Propane's Impact on Montana Economy |  |  |  |
| :---: | :---: | :---: | :---: |
| 2018 Odorized Propane Sales Breakout |  | 2018 Contribution to State E | onomy |
| (Gallons) | (\% of State) |  | (\$1,000) |
| Residential 74,260,091 | 70.5\% | Total Market Value of Odorized Propane Sold in Montana $\mathbf{( \$ 1 , 0 0 0 )}$ | \$194,864 |
| Commercial 25,375,582 | 24.1\% |  |  |
| Cylinder 1,124,908 | 1.1\% | Supply | \$7,607 |
| Internal Combustion 593,000 | 0.6\% | Transportation, Storage, and Wholesale | \$9,401 |
| Industrial 2,093,000 | 2.0\% | Retail | \$95,540 |
| Agricultural 1,838,000 | 1.7\% |  |  |
| $\begin{array}{lcc}\text { Total Montana Odorized Propane } & \\ \text { Demand } & 105,284,581 & 100.0 \%\end{array}$ |  | Total Direct Value Added in Montana | \$112,549 |
|  |  | Indirect and Induced | \$294,894 |
| Total Propane-Heated $\quad 56,685$ Households |  | Total Odorized Propane Industry Contribution to Montana GDP | \$407,443 |
| Propane Share of Montana Home Heating | 13.14\% |  |  |
| 2018 Employment |  | 2018 Labor Income |  |
|  |  |  | (\$1,000) |
| Production | 35 | Production | \$3,963 |
| Transportation, Storage, and Wholesale | 10 | Transportation, Storage, and Wholesale | \$790 |
| Retail | 281 | Retail | \$16,402 |
| Direct Montana Employment Related to Odorized Propane | 327 | Direct Labor Income in Montana Odorized Propane Industry | \$21,156 |


| 2018 Odorized Propane Production |  |
| :--- | :---: |
|  | (Gallons) |
| (\% of U.S. |  |
| Total) |  |$|$

## A. 30 Odorized Propane's Impact on Nebraska Economy

2018 Odorized Propane Sales Breakout
(Gallons) (\% of State)

|  |  |  |
| :--- | ---: | ---: |
| Residential | $69,158,092$ | $64.2 \%$ |
| Commercial | $9,445,245$ | $8.8 \%$ |
| Cylinder | $2,383,486$ | $2.2 \%$ |
| Internal Combustion | $2,404,000$ | $2.2 \%$ |
| Industrial | $2,287,000$ | $2.1 \%$ |
| Agricultural | $22,118,000$ | $20.5 \%$ |


| Total Nebraska Odorized Propane Demand | 107,795,823 | 100.0\% |
| :---: | :---: | :---: |
| Total Propane-Heated Households | 58,072 |  |
| Propane Share of Nebraska |  | 7.59\% |


| 2018 Employment |  |  |  |
| :--- | :--- | :--- | :--- |
|  |  |  |  |


\left.| 2018 Odorized Propane Production |
| :--- | :---: | :---: |
| (\% of U.S. |
| Total) |$\right]$

2018 Contribution to State Economy

| Total Market Value of Odorized Propane | $\mathbf{\$ 1 8 7 , 1 3 2}$ |
| :--- | ---: |
| Sold in Nebraska (\$1,000) | $\$ 402$ |
| Supply | $\$ 36,308$ |
| Transportation, Storage, and Wholesale |  |
| Retail | $\$ 184,953$ |
|  |  |
| Total Direct Value Added in Nebraska | $\$ 221,663$ |
| Indirect and Induced | $\$ 513,786$ |
| Total Odorized Propane Industry <br> Contribution to Nebraska GDP | $\$ 735,449$ |


| 2018 Odorized Propane Sales Breakout |  | 2018 Contribution to State Economy |  |
| :---: | :---: | :---: | :---: |
| (Gallons) | (\% of State) |  | (\$1,000) |
| Residential 16,823,191 | 35.1\% | Total Market Value of Odorized Propane Sold in Nevada $(\$ 1,000)$ | \$89,356 |
| Commercial 13,420,260 | 28.0\% |  |  |
| Cylinder 3,484,004 | 7.3\% | Supply | \$50 |
| Internal Combustion 3,777,000 | 7.9\% | Transportation, Storage, and Wholesale | \$4,162 |
| Industrial 9,528,000 | 19.9\% | Retail | \$18,031 |
| Agricultural 882,000 | 1.8\% |  |  |
| Total Nevada Odorized Propane 10010 100.0\%Demand |  | Total Direct Value Added in Nevada | \$22,243 |
|  |  | Indirect and Induced | \$173,313 |
| Total Propane-Heated Households |  | Total Odorized Propane Industry Contribution to Nevada GDP | \$195,556 |
| Propane Share of Nevada Home Heating | 2.30\% |  |  |
| 2018 Employment |  | 2018 Labor Income |  |
|  |  |  | (\$1,000) |
| Production | 0 | Production | \$43 |
| Transportation, Storage, and Wholesale | 4 | Transportation, Storage, and Wholesale | \$314 |
| Retail | 244 | Retail | \$15,699 |
| Direct Nevada Employment Related to Odorized Propane | 248 | Direct Labor Income in Nevada Odorized Propane Industry | \$16,056 |


| 2018 Odorized Propane Production |  |  |
| :--- | :---: | :---: |
|  | (Gallons) | (\% of U.S. <br> Total) |
| Refineries |  |  |
| Gas Processing Plants | 180,000 | $0.01 \%$ |
| Total Nevada Odorized Propane | - | $0.00 \%$ |
| Production | $\mathbf{1 8 0 , 0 0 0}$ | $\mathbf{0 . 0 0 \%}$ |


| Odorized Propane's Impact on New Hampshire |  |  |  |
| :---: | :---: | :---: | :---: |
| 2018 Odorized Propane Sales Breakout |  | 2018 Contribution to State Economy |  |
| (Gallons) | (\% of State) |  | (\$1,000) |
| Residential 114,861,774 | 61.8\% | Total Market Value of Odorized Propane Sold in New Hampshire $(\$ 1,000)$ | \$416,114 |
| Commercial 61,926,248 | 33.3\% |  |  |
| Cylinder 3,017,853 | 1.6\% | Supply | \$0 |
| Internal Combustion 763,000 | 0.4\% | Transportation, Storage, and Wholesale | \$16,118 |
| Industrial 5,145,000 | 2.8\% | Retail | \$101,655 |
| Agricultural 83,000 | 0.0\% |  |  |
| Total New Hampshire Odorized $185,796,875$ $100.0 \%$ <br>    <br> Propane Demand   |  | Total Direct Value Added in New Hampshire | \$117,773 |
|  |  | Indirect and Induced | \$270,246 |
| Total Propane-Heated $\quad \mathbf{8 6 , 6 9 5}$ Households |  | Total Odorized Propane Industry Contribution to New Hampshire GDP | \$388,018 |
| Propane Share of New Hampshire Home Heating | 16.32\% |  |  |
| 2018 Employment |  | 2018 Labor Income |  |
|  |  |  | (\$1,000) |
| Production |  | Production | \$0 |
| Transportation, Storage, and Wholesale | 15 | Transportation, Storage, and Wholesale | \$1,213 |
| Retail | 1,100 | Retail | \$88,581 |
| Direct New Hampshire Employment Related to Odorized Propane | 1,115 | Direct Labor Income in New Hampshire Odorized Propane Industry | \$89,794 |

2018 Odorized Propane Production

|  | (Gallons) | (\% of U.S. <br> Total) |
| :---: | :---: | :---: |
| Refineries | - | $0.00 \%$ |
| Gas Processing Plants | - | $0.00 \%$ |
| Total New Hampshire Odorized | - | $\mathbf{0 . 0 0 \%}$ |
| Propane Production |  |  |

## A. 33 Odorized Propane's Impact on New Jersey Economy

2018 Odorized Propane Sales Breakout
(Galons) (\% of State)

|  |  |  |
| :--- | ---: | ---: |
| Residential | $47,091,200$ | $57.3 \%$ |
| Commercial | $14,657,207$ | $17.8 \%$ |
| Cylinder | $6,762,294$ | $8.2 \%$ |
| Internal Combustion | $8,581,000$ | $10.4 \%$ |
| Industrial | $3,169,000$ | $3.9 \%$ |
| Agricultural | $1,968,000$ | $2.4 \%$ |
| Total New Jersey Odorized | $\mathbf{8 2 , 2 2 8 , 7 0 1}$ | $\mathbf{1 0 0 . 0 \%}$ |
| Propane Demand |  |  |
| $\mathbf{6 7 , 9 3 0}$ |  |  |
| Total Propane-Heated | $\mathbf{2 . 0 9 \%}$ |  |
| Households |  |  |
| Propane Share of New Jersey Home Heating |  |  |


| 2018 Employment |  | 2018 Labor Income |  |
| :---: | :---: | :---: | :---: |
|  |  |  | (1,000) |
| Production | 3 | Production | \$468 |
| Transportation, Storage, and Wholesale | 10 | Transportation, Storage, and Wholesale | \$826 |
| Retail | 745 | Retail | \$57,413 |
| Direct New Jersey Employment Related to Odorized Propane | 759 | Direct Labor Income in New Jersey Odorized Propane Industry | \$58,707 |


| 2018 Odorized Propane Production |
| :--- | :---: | :---: |
| (\% of U.S. |
| Total) |$|$| (Gallons) |
| :--- |

2018 Contribution to State Economy

| Total Market Value of Odorized Propane | $\mathbf{\$ 1 8 2 , 5 3 4}$ |
| :--- | ---: |
| Sold in New Jersey ( $\mathbf{\$ 1 , 0 0 0 )}$ |  |
| Supply | $\$ 5,638$ |
| Transportation, Storage, and Wholesale | $\$ 8,140$ |
| Retail | $\$ 99,821$ |
|  |  |
| Total Direct Value Added in New Jersey | $\mathbf{\$ 1 1 3 , 5 9 9}$ |
| Indirect and Induced | $\$ 313,304$ |
| Total Odorized Propane Industry <br> Contribution to New Jersey GDP | $\$ 426,903$ |

## A. 34 Odorized Propane's Impact on New Mexico Economy

2018 Odorized Propane Sales Breakout
(Gallons) (\% of State)

|  |  |  |
| :--- | ---: | ---: |
| Residential | $44,702,054$ | $55.6 \%$ |
| Commercial | $17,503,973$ | $21.8 \%$ |
| Cylinder | $3,829,608$ | $4.8 \%$ |
| Internal Combustion | $1,825,000$ | $2.3 \%$ |
| Industrial | $10,320,000$ | $12.8 \%$ |
| Agricultural | $2,184,000$ | $2.7 \%$ |
| Total New Mexico Odorized | $\mathbf{8 0 , 3 6 4 , 6 3 5}$ | $\mathbf{1 0 0 . 0 \%}$ |
| Propane Demand |  |  |
| Total Propane-Heated | $\mathbf{5 7 , 2 5 4}$ |  |
| Households  <br> Propane Share of New Mexico Home Heating $\mathbf{7 . 2 1 \%}$ |  |  |


| 2018 Employment |  | 2018 Labor Income |  |
| :---: | :---: | :---: | :---: |
|  |  |  | (\$1,000) |
| Production | 730 | Production | \$81,730 |
| Transportation, Storage, and Wholesale | 37 | Transportation, Storage, and Wholesale | \$3,393 |
| Retail | 526 | Retail | \$25,003 |
| Direct New Mexico Employment Related to Odorized Propane | 1,293 | Direct Labor Income in New Mexico Odorized Propane Industry | \$110,126 |


\left.| 2018 Odorized Propane Production |
| :--- | ---: | ---: |
| (\% of U.S. |
| Total) |$\right]$

2018 Contribution to State Economy
(\$1,000)

| Total Market Value of Odorized Propane <br> Sold in New Mexico $\mathbf{( \$ 1 , 0 0 0 )}$ | $\mathbf{\$ 1 5 8 , 6 7 5}$ |
| :--- | ---: |
| Supply |  |
| Transportation, Storage, and Wholesale | $\$ 208,747$ |
| Retail | $\$ 13,045$ |


|  |  |
| :--- | :--- |
| Total Direct Value Added in New Mexico | $\$ 305,346$ |
| Indirect and Induced | $\$ 559,021$ |
| Total Odorized Propane Industry | $\$ 864,367$ |
| Contribution to New Mexico GDP |  | Odorized Propane Industry


\section*{| 2018 Odorized Propane Sales Breakout |
| :---: |
| (Gallons) (\% of State) |}

A. 35 Odorized Propane's Impact on New York Economy

|  |  |  |
| :--- | ---: | ---: |
| Residential | $282,955,485$ | $67.7 \%$ |
| Commercial | $88,962,970$ | $21.3 \%$ |
| Cylinder | $15,175,658$ | $3.6 \%$ |
| Internal Combustion | $12,300,000$ | $2.9 \%$ |
| Industrial | $9,048,000$ | $2.2 \%$ |
| Agricultural | $9,575,000$ | $2.3 \%$ |
| Total New York Odorized | $\mathbf{4 1 8 , 0 1 7 , 1 1 3}$ | $\mathbf{1 0 0 . 0 \%}$ |
| Propane Demand |  |  |
|  | $\mathbf{3 0 8 , 0 2 0}$ |  |
| Total Propane-Heated | $\mathbf{4 . 1 8 \%}$ |  |
| Households |  |  |
| Propane Share of New York Home Heating |  |  |

2018 Contribution to State Economy

| Total Market Value of Odorized Propane | $\mathbf{\$ 9 5 7 , 2 9 7}$ |
| :--- | ---: |
| Sold in New York (\$1,000) | $\$ 43$ |
| Supply | $\$ 36,262$ |
| Transportation, Storage, and Wholesale |  |
| Retail | $\$ 537,067$ |
|  | $\$ 573,372$ |
| Total Direct Value Added in New York | $\$ 1,130,688$ |
| Indirect and Induced | $\mathbf{\$ 1 , 7 0 4 , 0 6 0}$ |
| Total Odorized Propane Industry <br> Contribution to New York GDP |  |


| 2018 Employment |  |
| :--- | ---: |
|  |  |
| Production | 0 |
| Transportation, Storage, and Wholesale | 34 |
| Retail | 2,776 |
| Direct New York Employment Related to | $\mathbf{2 , 8 1 1}$ |


| 2018 Labor Income |  |
| :--- | ---: |
|  | $(\$ 1,000)$ |
|  | $\$ 35$ |
| Production | $\$ 2,729$ |
| Transportation, Storage, and Wholesale | $\$ 224,948$ |
| Retail | $\mathbf{\$ 2 2 7 , 7 1 2}$ |
| Direct Labor Income in New York <br> Odorized Propane Industry |  |


| 2018 Odorized Propane Production |
| :--- | :---: |
| (\% of U.S. |
| Total) |$|$| (Gallons) |
| :--- |

## A. 36 Odorized Propane's Impact on North Carolina Economy

## 2018 Odorized Propane Sales Breakout <br> (Gallons) (\% of State)

|  |  |  |
| :--- | ---: | ---: |
| Residential | $188,140,751$ | $47.8 \%$ |
| Commercial | $84,685,722$ | $21.5 \%$ |
| Cylinder | $16,436,644$ | $4.2 \%$ |
| Internal Combustion | $16,096,000$ | $4.1 \%$ |
| Industrial | $17,325,000$ | $4.4 \%$ |
| Agricultural | $70,507,000$ | $17.9 \%$ |
| Total North Carolina Odorized |  |  |
| Propane Demand | $\mathbf{3 9 3 , 1 9 1 , 1 1 7}$ | $\mathbf{1 0 0 . 0 \%}$ |

Total Propane-Heated
Households

| 2018 Employment |  |
| :--- | ---: |
|  |  |
| Production | - |
| Transportation, Storage, and Wholesale | 50 |
| Retail | 2,680 |
| Direct North Carolina Employment Related to <br> Odorized Propane | $\mathbf{2 , 7 3 1}$ |

2018 Odorized Propane Production

|  | (Gallons) | (\% of U.S. <br> Total) |
| :--- | :---: | :---: |
| Refineries | - | $0.00 \%$ |
| Gas Processing Plants | - | $0.00 \%$ |
| Total North Carolina Odorized |  |  |
|  | - | $\mathbf{0 . 0 0 \%}$ |

2018 Contribution to State Economy

| Total Market Value of Odorized Propane | $\mathbf{\$ 7 8 1 , 9 3 6}$ |
| :--- | ---: |
| Sold in North Carolina $(\mathbf{\$ 1 , 0 0 0 )}$ |  |
|  | $\$ 0$ |
| Supply | $\$ 38,961$ |
| Transportation, Storage, and Wholesale | $\$ 382,266$ |
| Retail |  |


| Total Direct Value Added in North | $\mathbf{\$ 4 2 1 , 2 2 7}$ |
| :--- | ---: |
| Indirect and Induced | $\$ 792,153$ |
| Total Odorized Propane Industry <br> Contribution to North Carolina GDP | $\mathbf{\$ 1 , 2 1 3 , 3 8 1}$ |


| 2018 Labor Income |  |
| :--- | ---: |
|  | $(\$ 1,000)$ |
|  | $\$ 0$ |
| Production | $\$ 4,033$ |
| Transportation, Storage, and Wholesale | $\$ 150,185$ |
| Retail |  |
| Direct Labor Income in North Carolina <br> Odorized Propane Industry | $\mathbf{\$ 1 5 4 , 2 1 8}$ |

Impact of the U.S. Consumer Propane Industry on U.S. and State Economies in 2018

| Odorized Propane's Impact on North Dakota |  |  |  |
| :---: | :---: | :---: | :---: |
| 2018 Odorized Propane Sales Breakout |  | 2018 Contribution to State E | conomy |
| (Gallons) | (\% of State) |  | $(\$ 1,000)$ |
| Residential 67,480,502 | 56.0\% | Total Market Value of Odorized Propane Sold in North Dakota $(\$ 1,000)$ | \$208,804 |
| Commercial 14,778,565 | 12.3\% |  |  |
| Cylinder 2,085,210 | 1.7\% | Supply | \$312,218 |
| Internal Combustion 982,000 | 0.8\% | Transportation, Storage, and Wholesale | \$18,645 |
| Industrial 14,554,000 | 12.1\% | Retail | \$206,364 |
| Agricultural 20,649,000 | 17.1\% |  |  |
| Total North Dakota Odorized Propane Demand | 100.0\% | Total Direct Value Added in North Dakota | \$537,227 |
|  |  | Indirect and Induced | \$836,487 |
| Total Propane-Heated $\quad 45,025$ Households |  | Total Odorized Propane Industry Contribution to North Dakota GDP | \$1,373,714 |
| Propane Share of North Dakota Home Heating | 14.10\% |  |  |
| 2018 Employment |  | 2018 Labor Income |  |
|  |  |  | (\$1,000) |
| Production | 1,035 | Production | \$115,799 |
| Transportation, Storage, and Wholesale | 49 | Transportation, Storage, and Wholesale | \$4,417 |
| Retail | 85 | Retail | \$4,870 |
| Direct North Dakota Employment Related to Odorized Propane | 1,168 | Direct Labor Income in North Dakota Odorized Propane Industry | \$125,086 |

2018 Odorized Propane Production

|  | (Gallons) | (\% of U.S. <br> Total) |
| :--- | ---: | ---: |
| Refineries | $5,386,000$ | $0.36 \%$ |
| Gas Processing Plants | $488,676,000$ | $6.84 \%$ |
| Total North Dakota Odorized | $494,062,000$ | $\mathbf{5 . 7 3 \%}$ |
| Propane Production |  |  |

(\$1,000)

Direct Labor Income in North Dakota Odorized Propane Industry

## A. 38 Odorized Propane's Impact on Ohio Economy

2018 Odorized Propane Sales Breakout

|  |  |  |
| :--- | ---: | ---: |
| Residential | $195,708,791$ | $62.7 \%$ |
| Commercial | $47,109,170$ | $15.1 \%$ |
| Cylinder | $11,031,669$ | $3.5 \%$ |
| Internal Combustion | $22,733,000$ | $7.3 \%$ |
| Industrial | $6,622,000$ | $2.1 \%$ |
| Agricultural | $28,923,000$ | $9.3 \%$ |


| Total Ohio Odorized Propane | $\mathbf{3 1 2 , 1 2 7 , 6 2 9}$ | $\mathbf{1 0 0 . 0 \%}$ |
| :--- | :---: | :---: |
| Demand |  |  |
| Total Propane-Heated | $\mathbf{2 4 4 , 7 8 5}$ |  |
| Households <br> Propane Share of Ohio Home Heating |  | $5.22 \%$ |

2018 Contribution to State Economy

| Total Market Value of Odorized Propane | $\mathbf{\$ 5 4 1 , 1 4 2}$ |
| :--- | ---: |
| Sold in Ohio (\$1,000) |  |
| Supply | $\$ 120,598$ |
| Transportation, Storage, and Wholesale | $\$ 57,044$ |
| Retail | $\$ 534,828$ |
|  | $\$ 712,470$ |
| Total Direct Value Added in Ohio | $\$ 1,561,668$ |
| Indirect and Induced | $\mathbf{\$ 2 , 2 7 4 , 1 3 8}$ |
| Total Odorized Propane Industry <br> Contribution to Ohio GDP |  |


| 2018 Employment |  | 2018 Labor Income |  |
| :---: | :---: | :---: | :---: |
|  |  |  | (\$1,000) |
| Production | 193 | Production | \$21,813 |
| Transportation, Storage, and Wholesale | 138 | Transportation, Storage, and Wholesale | \$11,417 |
| Retail | 1,258 | Retail | \$71,018 |
| Direct Ohio Employment Related to Odorized Propane | 1,589 | Direct Labor Income in Ohio Odorized Propane Industry | \$104,249 |


| 2018 Odorized Propane Production |  |  |
| :--- | ---: | ---: |
|  | (Gallons) | (\% of U.S. <br> Total) |
|  | $46,182,000$ | $3.11 \%$ |
| Refineries | $183,358,000$ | $2.57 \%$ |
| Gas Processing Plants | $\mathbf{2 2 9 , 5 4 0 , 0 0 0}$ | $\mathbf{2 . 6 6 \%}$ |
| Total Ohio Odorized Propane |  |  |
| Production |  |  |

## A. 39 Odorized Propane's Impact on Oklahoma Economy

2018 Odorized Propane Sales Breakout
(Gallons) (\% of State)

2018 Contribution to State Economy

| Total Market Value of Odorized Propane | $\mathbf{\$ 2 3 9 , 0 3 4}$ |
| :--- | ---: |
| Sold in Oklahoma (\$1,000) |  |
| Supply | $\$ 469,882$ |
| Transportation, Storage, and Wholesale | $\$ 57,990$ |
| Retail | $\$ 236,240$ |
|  | $\$ 764,111$ |
| Total Direct Value Added in Oklahoma | $\$ 1,172,808$ |
| Indirect and Induced <br> Total Odorized Propane Industry <br> Contribution to Oklahoma GDP | $\mathbf{\$ 1 , 9 3 6 , 9 2 0}$ |


| Households | 100,674 |
| :--- | :--- |
| Propane Share of Oklahoma Home Heating |  |


| 2018 Employment |  |
| :--- | ---: |
|  |  |
| Production | 1,154 |
| Transportation, Storage, and Wholesale | 519 |
| Retail | 1,861 |
| Direct Oklahoma Employment Related to | $\mathbf{1 , 8 6 1}$ |

## 2018 Labor Income

(\$1,000)

Production
\$129,497
Transportation, Storage, and Wholesale $\$ 16,846$
Retail
\$27,205
Direct Labor Income in Oklahoma
Odorized Propane Industry

| 2018 Odorized Propane Production |  |  |
| :---: | :---: | :---: |
|  | (Gallons) | $\begin{gathered} \text { (\% of U.S. } \\ \text { Total) } \end{gathered}$ |
| Refineries | 33,304,000 | 2.25\% |
| Gas Processing Plants | 949,741,000 | 13.30\% |
| Total Oklahoma Odorized Propane Production | 983,045,000 | 11.40\% |

A. 40 Odorized Propane's Impact on Oregon Economy

## 2018 Odorized Propane Sales Breakout <br> (Gallons) (\% of State)

|  |  |  |
| :--- | ---: | ---: |
| Residential | $26,212,966$ | $28.4 \%$ |
| Commercial | $38,242,661$ | $41.4 \%$ |
| Cylinder | $4,999,148$ | $5.4 \%$ |
| Internal Combustion | $5,907,000$ | $6.4 \%$ |
| Industrial | $11,825,000$ | $12.8 \%$ |
| Agricultural | $5,268,000$ | $5.7 \%$ |


| Total Oregon Odorized Propane | 92,454,774 |
| :--- | ---: | ---: |
| Demand |  |


| Total Propane-Heated | $\mathbf{2 6 , 7 0 7}$ |  |
| :--- | :--- | :--- |
| Households |  | $1.63 \%$ |

2018 Employment

| Production | - |
| :--- | ---: |
| Transportation, Storage, and Wholesale | 8 |
| Retail | 320 |

Direct Oregon Employment Related to Odorized ..... 328

2018 Contribution to State Economy
(\$1,000)
Total Market Value of Odorized Propane $\quad \$ 169,809$
Sold in Oregon $(\$ 1,000)$
Supply \$0
Transportation, Storage, and Wholesale \$8,020

Retail \$32,158

| Total Direct Value Added in Oregon | $\mathbf{\$ 4 0 , 1 7 8}$ |
| :--- | ---: |
| Indirect and Induced | $\$ 501,676$ |
| Total Odorized Propane Industry | $\$ 541,854$ |
| Contribution to Oregon GDP |  |


| 2018 Labor Income |  |
| :--- | ---: |
|  | $(\$ 1,000)$ |
|  | $\$ 0$ |
| Production | $\$ 603$ |
| Transportation, Storage, and Wholesale | $\$ 18,815$ |
| Retail |  |
| Direct Labor Income in Oregon | $\$ 19,418$ |
| Odorized Propane Industry |  |


| 2018 Odorized Propane Production |  |  |
| :--- | :---: | :---: |
|  | (Gallons) | of U.S. <br> Total) |
| Refineries |  |  |
| Gas Processing Plants | - | $0.00 \%$ |
| Total Oregon Odorized Propane <br> Production | - | $0.00 \%$ |

## A. 41 Odorized Propane's Impact on Pennsylvania Economy

2018 Odorized Propane Sales Breakout

|  |  |  |
| :--- | ---: | ---: |
| Residential | $216,580,223$ | $57.1 \%$ |
| Commercial | $91,953,852$ | $24.2 \%$ |
| Cylinder | $10,508,566$ | $2.8 \%$ |
| Internal Combustion | $15,970,000$ | $4.2 \%$ |
| Industrial | $19,162,000$ | $5.0 \%$ |
| Agricultural | $25,395,000$ | $6.7 \%$ |
| Total Pennsylvania Odorized |  |  |
| Propane Demand | $\mathbf{3 7 9 , 5 6 9}, 641$ | $\mathbf{1 0 0 . 0 \%}$ |

Total Propane-Heated $\quad 225,476$
Households
Propane Share of Pennsylvania Home Heating

| 2018 Employment |  |
| :--- | ---: |
|  |  |
| Production | 176 |
| Transportation, Storage, and Wholesale | 79 |
| Retail | 2,362 |
| Direct Pennsylvania Employment Related to | $\mathbf{2 , 6 1 7}$ |
| Odorized Propane |  |

2018 Contribution to State Economy

| Total Market Value of Odorized Propane | $\mathbf{\$ 8 4 1 , 8 1 9}$ |
| :--- | ---: |
| Sold in Pennsylvania (\$1,000) |  |
| Supply | $\$ 119,145$ |
| Transportation, Storage, and Wholesale | $\$ 45,390$ |
| Retail | $\$ 460,007$ |
|  |  |
| Total Direct Value Added in | $\$ 624,543$ |
| Pennsylvania | $\$ 1,131,076$ |
| Indirect and Induced | $\$ 1,755,619$ |
| Total Odorized Propane Industry |  |
| Contribution to Pennsylvania GDP |  |


| 2018 Labor Income |  |
| :--- | ---: |
|  | $(\$ 1,000)$ |
|  | $\$ 19,913$ |
| Production | $\$ 6,570$ |
| Transportation, Storage, and Wholesale | $\$ 154,871$ |
| Retail |  |
| Direct Labor Income in Pennsylvania | $\mathbf{\$ 1 8 1 , 3 5 4}$ |
| Odorized Propane Industry |  |

## 2018 Odorized Propane Production

|  | (Gallons) |  |
| :--- | ---: | ---: |
| (\% of U.S. <br> Total) |  |  |
| Refineries | $43,602,000$ | $2.94 \%$ |
| Gas Processing Plants | $201,350,000$ | $2.82 \%$ |
| Total Pennsylvania Odorized | $244,952,000$ | $\mathbf{2 . 8 4 \%}$ |
| Propane Production |  |  |

## A. 42 Odorized Propane's Impact on Rhode Island Economy

| 2018 Odorized Propane Sales Breakout |  |  |
| :---: | :---: | :---: |
|  | (Galons) | (\% of State) |
| Residential | 18,453,000 | 56.4\% |
| Commercial | 8,408,301 | 25.7\% |
| Cylinder | 1,717,000 | 5.2\% |
| Internal Combustion | 1,206,000 | 3.7\% |
| Industrial | 2,858,000 | 8.7\% |
| Agricultural | 86,000 | 0.3\% |
| Total Rhode Island Odorized Propane Demand | 32,728,301 | 100.0\% |
| Total Propane-Heated Households | 11,618 |  |

2018 Employment

| Production | - |
| :--- | ---: |
| Transportation, Storage, and Wholesale | 3 |
| Retail | 272 |

Direct Rhode Island Employment Related to 275
Odorized Propane

## 2018 Contribution to State Economy

 (\$1,000)| Total Market Value of Odorized Propane Sold in Rhode Island $(\$ 1,000)$ | \$71,949 |
| :---: | :---: |
| Supply | \$0 |
| Transportation, Storage, and Wholesale | \$2,839 |
| Retail | \$16,546 |
| Total Direct Value Added in Rhode Island | \$19,385 |
| Indirect and Induced | \$440,890 |
| Total Odorized Propane Industry Contribution to Rhode Island GDP | \$460,274 |

## 2018 Labor Income

## (\$1,000)

| Production | $\$ 0$ |
| :--- | ---: |
| Transportation, Storage, and Wholesale | $\$ 214$ |
| Retail | $\$ 18,562$ |
|  |  |
| Direct Labor Income in Rhode Island | $\mathbf{\$ 1 8 , 7 7 5}$ |
| Odorized Propane Industry |  |

2018 Odorized Propane Production

|  | (Gallons) | (\% of U.S. <br> Total) |
| :---: | :---: | :---: |
| Refineries | - | $0.00 \%$ |
| Gas Processing Plants | - | $0.00 \%$ |
| Total Rhode Island Odorized | - | $\mathbf{0 . 0 0 \%}$ |
| Propane Production |  |  |

A. 43 Odorized Propane's Impact on South Carolina Economy

| 2018 Odorized Propane Sales Breakout |
| :---: |
| (Galons) (\% of State) |

2018 Contribution to State Economy

| Total Market Value of Odorized Propane | $\mathbf{\$ 2 0 7 , 8 1 7}$ |
| :--- | ---: |
| Sold in South Carolina $\mathbf{( \$ 1 , 0 0 0 )}$ |  |
| Supply | $\$ 0$ |
| Transportation, Storage, and Wholesale | $\$ 14,108$ |
| Retail | $\$ 99,326$ |


| Total Direct Value Added in South | $\mathbf{\$ 1 1 3 , 4 3 4}$ |
| :--- | :--- |
| Carolina | $\$ 465,184$ |
| Indirect and Induced | $\$ 578,618$ |
| Total Odorized Propane Industry <br> Contribution to South Carolina GDP |  |

## 2018 Employment

| 2018 Labor Income |  |
| :--- | ---: |
|  | $(\$ 1,000)$ |
|  | $\$ 0$ |
| Production | $\$ 2,163$ |
| Transportation, Storage, and Wholesale | $\$ 54,868$ |
| Retail |  |
| Direct Labor Income in South Carolina | $\$ 57,031$ |
| Odorized Propane Industry |  |

2018 Odorized Propane Production

|  | (Gallons) | (\% of U.S. <br> Total) |
| :---: | :---: | :---: |
| Refineries | - | $0.00 \%$ |
| Gas Processing Plants | - | $0.00 \%$ |
| Total South Carolina Odorized <br> Propane Production | - | $\mathbf{0 . 0 0 \%}$ |



## 2018 Odorized Propane Production

|  | (Gallons) | (\% of U.S. <br> Total) |
| :---: | :---: | :---: |
| Refineries | - | $0.00 \%$ |
| Gas Processing Plants | - | $0.00 \%$ |
| Total South Dakota Odorized | - | $\mathbf{0 . 0 0 \%}$ |
| Propane Production |  |  |

A. 45 Odorized Propane's Impact on Tennessee Economy
2018 Odorized Propane Sales Breakout

|  |  |  |
| :--- | ---: | ---: |
|  | $67,776,313$ | $57.5 \%$ |
| Residential | $25,714,106$ | $21.8 \%$ |
| Commercial | $4,737,979$ | $4.0 \%$ |
| Cylinder | $11,833,000$ | $10.0 \%$ |
| Internal Combustion | $3,624,000$ | $3.1 \%$ |
| Industrial | $4,174,000$ | $3.5 \%$ |
| Agricultural |  |  |
| Total Tennessee Odorized | $\mathbf{1 1 7 , 8 5 9 , 3 9 8}$ | $\mathbf{1 0 0 . 0 \%}$ |
| Propane Demand |  |  |
| $\mathbf{8 8 , 0 7 5}$ |  |  |
| Total Propane-Heated |  |  |
| Households <br> Propane Share of Tennessee Home Heating | $\mathbf{3 . 3 8 \%}$ |  |

2018 Contribution to State Economy

| Total Market Value of Odorized Propane | $\mathbf{\$ 2 0 3 , 4 8 5}$ |
| :--- | ---: |
| Sold in Tennessee (\$1,000) |  |
| Supply | $\$ 421$ |
| Transportation, Storage, and Wholesale |  |
| Retail | $\$ 10,643$ |
|  | $\$ 201,093$ |
| Total Direct Value Added in Tennessee | $\mathbf{\$ 2 1 2 , 1 5 7}$ |
| Indirect and Induced | $\$ 620,324$ |
| Total Odorized Propane Industry <br> Contribution to Tennessee GDP | $\mathbf{\$ 8 3 2 , 4 8 1}$ |


| 2018 Labor Income |  |
| :--- | ---: |
|  | $(\$ 1,000)$ |
|  | $\$ 273$ |
| Production | $\$ 891$ |
| Transportation, Storage, and Wholesale | $\$ 46,549$ |
| Retail |  |
| Direct Labor Income in Tennessee | $\$ 47,713$ |
| Odorized Propane Industry |  |


| 2018 Odorized Propane Production |  |  |
| :--- | ---: | ---: |
|  | (Gallons) | \% of U.S. <br> Total) |
| Refineries | $13,783,000$ | $0.93 \%$ |
| Gas Processing Plants | 851,000 | $0.01 \%$ |
| Total Tennessee Odorized <br> Propane Production | $\mathbf{1 4 , 6 3 4 , 0 0 0}$ | $\mathbf{0 . 1 7 \%}$ |

Impact of the U.S. Consumer Propane Industry on U.S. and State Economies in 2018
A. 46 Odorized Propane's Impact on Texas Economy

2018 Odorized Propane Sales Breakout (Gallons) (\% of State)

|  |  |  |
| :--- | ---: | ---: |
| Residential | $147,100,865$ | $38.1 \%$ |
| Commercial | $104,058,395$ | $26.9 \%$ |
| Cylinder | $35,306,266$ | $9.1 \%$ |
| Internal Combustion | $42,384,000$ | $11.0 \%$ |
| Industrial | $42,649,000$ | $11.0 \%$ |
| Agricultural | $14,946,000$ | $3.9 \%$ |
| Total Texas Odorized Propane |  |  |
| Demand | $\mathbf{3 8 6 , 4 4 4 , 5 2 6}$ | $\mathbf{1 0 0 . 0 \%}$ |


| Total Propane-Heated | $\mathbf{2 7 6 , 1 1 1}$ |  |
| :--- | :--- | :--- |
| Households <br> Propane Share of Texas Home Heating | $2.82 \%$ |  |


| 2018 Employment |  |
| :--- | ---: |
|  |  |
| Production | 5,106 |
| Transportation, Storage, and Wholesale | 285 |
| Retail | 2,443 |
| Direct Texas Employment Related to Odorized <br> Propane | $\mathbf{7 , 8 3 3}$ |

2018 Contribution to State Economy (\$1,000)

| Total Market Value of Odorized Propane | $\mathbf{\$ 7 3 8 , 2 7 6}$ |
| :--- | ---: |
| Sold in Texas $\mathbf{( \$ 1 , 0 0 0 )}$ |  |
| Supply | $\$ 2,114,003$ |
| Transportation, Storage, and Wholesale | $\$ 98,349$ |
| Retail | $\$ 376,838$ |


|  | $\mathbf{\$ 2 , 5 8 9 , 1 8 9}$ |
| :--- | :--- |
| Indirect and Induced | $\$ 4,046,925$ |
| Total Odorized Propane Industry | $\mathbf{\$ 6 , 6 3 6 , 1 1 4}$ |
| Contribution to Texas GDP |  |


| 2018 Labor Income |  |
| :--- | ---: |
|  | $(\$ 1,000)$ |
|  |  |
| Production | $\$ 573,255$ |
| Transportation, Storage, and Wholesale | $\$ 26,254$ |
| Retail | $\$ 170,168$ |
|  |  |

## 2018 Odorized Propane Production

$\left.$|  | (Gallons) |  |
| :--- | ---: | ---: | | (\% of U.S. |
| ---: |
| Total) | \right\rvert\,

Impact of the U.S. Consumer Propane Industry on U.S. and State Economies in 2018
A. 47 Odorized Propane's Impact on Utah Economy


2018 Contribution to State Economy ( $\$ 1,000)$

| Total Market Value of Odorized Propane <br> Sold in Utah $\mathbf{( \$ 1 , 0 0 0 )}$ | $\mathbf{\$ 1 0 1 , 5 1 1}$ |
| :--- | ---: |
| Supply |  |
| Transportation, Storage, and Wholesale | $\$ 33,277$ |
| Retail | $\$ 7,540$ |


|  |  |
| :--- | ---: |
| Total Direct Value Added in Utah | $\$ 89,622$ |
| Indirect and Induced | $\$ 415,914$ |
| Total Odorized Propane Industry | $\$ 505,536$ |
| Contribution to Utah GDP |  |


| 2018 Labor Income |  |
| :--- | ---: |
|  | $(\$ 1,000)$ |
|  | $\$ 11,140$ |
| Production | $\$ 1,304$ |
| Transportation, Storage, and Wholesale | $\$ 12,197$ |
| Retail | $\mathbf{\$ 2 4 , 6 4 0}$ |


| 2018 Odorized Propane Production |  |
| :--- | ---: |
|  | (Gallons) |
| (\% of U.S. |  |
| Total) |  |$|$|  | $6,370,000$ | $0.43 \%$ |
| :--- | :--- | :--- |
| Refineries | $55,559,000$ | $0.78 \%$ |
| Gas Processing Plants | $\mathbf{6 1 , 9 2 9 , 0 0 0}$ | $\mathbf{0 . 7 2 \%}$ |
| Total Utah Odorized Propane <br> Production |  |  |

Impact of the U.S. Consumer Propane Industry on U.S. and State Economies in 2018

## A. 48 Odorized Propane's Impact on Vermont Economy

| 2018 Odorized Propane Sales Breakout |  |  |
| :---: | :---: | :---: |
|  | (Gallons) | (\% of State) |
| Residential | 76,618,577 | 64.3\% |
| Commercial | 38,113,907 | 32.0\% |
| Cylinder | 1,026,674 | 0.9\% |
| Internal Combustion | 185,000 | 0.2\% |
| Industrial | 2,663,000 | 2.2\% |
| Agricultural | 470,000 | 0.4\% |
| Total Vermont Odorized Propane Demand | 119,077,157 | 100.0\% |
| Total Propane-Heated Households | 44,423 |  |
| Propane Share of Vermont Home Heating |  | 17.00\% |

2018 Contribution to State Economy
Total Market Value of Odorized Propane $\quad \$ 269,170$
Sold in Vermont $(\$ 1,000)$ Sold in Vermont $(\$ 1,000)$
$\begin{array}{lr}\text { Supply } & \$ 0 \\ \text { Transportation, Storage, and Wholesale } & \$ 10,330\end{array}$
$\begin{array}{ll}\text { Transportation, Storage, and Wholesale } & \$ 10,330 \\ \text { Retail } & \$ 67,654\end{array}$

|  |  |
| :--- | ---: |
| Total Direct Value Added in Vermont | $\$ 77,983$ |
| Indirect and Induced | $\$ 399,936$ |
| Total Odorized Propane Industry | $\$ 477,919$ |
| Contribution to Vermont GDP |  |


| 2018 Labor Income |  |
| :---: | :---: |
|  | (\$1,000) |
| Production | \$0 |
| Transportation, Storage, and Wholesale | \$777 |
| Retail | \$44,017 |
| Direct Labor Income in Vermont Odorized Propane Industry | \$44,794 |

2018 Odorized Propane Production

|  | (Gallons) | (\% of U.S. <br> Total) |
| :--- | :---: | :---: |
| Refineries |  |  |
| Gas Processing Plants | - | $0.00 \%$ |
| Total Vermont Odorized Propane | - | $0.00 \%$ |
| Production | - | $\mathbf{0 . 0 0 \%}$ |

## A. 49 Odorized Propane's Impact on Virginia Economy



2018 Contribution to State Economy
Total Market Value of Odorized Propane Sold in Virginia $(\$ 1,000)$
\$500,513

Supply \$1
Transportation, Storage, and Wholesale $\$ 21,712$
Retail \$246,126

| Total Direct Value Added in Virginia | $\mathbf{\$ 2 6 7 , 8 3 9}$ |
| :--- | ---: |
| Indirect and Induced | $\$ 775,782$ |
| Total Odorized Propane Industry | $\mathbf{\$ 1 , 0 4 3 , 6 2 1}$ |
| Contribution to Virginia GDP |  |


| 2018 Labor Income |  |
| :--- | ---: |
|  | $(\$ 1,000)$ |
| Production | $\$ 1$ |
| Transportation, Storage, and Wholesale | $\$ 1,634$ |
| Retail | $\$ 98,740$ |
| Direct Labor Income in Virginia <br> Odorized Propane Industry | $\$ 100,374$ |

2018 Odorized Propane Production

|  | (Gallons) | (\% of U.S. <br> Total) |
| :--- | :--- | :---: |
| Refineries |  |  |
| Gas Processing Plants | - | $0.00 \%$ |
| Total Virginia Odorized Propane | - | $0.00 \%$ |
| Production | - | $\mathbf{0 . 0 0 \%}$ |

## A. 50 Odorized Propane's Impact on Washington Economy

| 2018 Odorized Propane Sales Breakout |  |  |
| :---: | :---: | :---: |
|  | (Gallons) | (\% of State) |
| Residential | 85,722,278 | 44.1\% |
| Commercial | 54,471,928 | 28.1\% |
| Cylinder | 8,952,486 | 4.6\% |
| Internal Combustion | 7,485,000 | 3.9\% |
| Industrial | 13,943,000 | 7.2\% |
| Agricultural | 23,620,000 | 12.2\% |
| Total Washington Odorized Propane Demand |  |  |
|  | 194,194,692 | 100.0\% |
| Total Propane-Heated Households | 90,813 |  |
| Propane Share of Washington Home Heating |  | 3.14\% |

2018 Contribution to State Economy
Total Market Value of Odorized Propane $\$ \mathbf{\$ 3 6 9 , 0 9 7}$
Sold in Washington $(\$ 1,000)$ Sold in Washington $(\$ 1,000)$\$0

| Supply | $\$ 0$ |
| :--- | ---: |
| Transportation, Storage, and Wholesale | $\$ 17,638$ |

Retail $\quad \$ 80,079$

| Total Direct Value Added in Washington | \$97,717 |
| :---: | :---: |
| Indirect and Induced | \$560,490 |
| Total Odorized Propane Industry Contribution to Washington GDP | \$658,208 |


| 2018 Labor Income |  |
| :--- | ---: |
|  | $(\$ 1,000)$ |
|  | $\$ 410$ |
| Production | $\$ 1,495$ |
| Transportation, Storage, and Wholesale | $\$ 54,191$ |
| Retail | $\$ 56,095$ |
| Direct Labor Income in Washington |  |

2018 Odorized Propane Production

| 2018 Odorized Propane Production |  |  |
| :--- | :---: | :---: |
|  | (Gallons) | (\% of U.S. <br> Total) |
| Refineries | $26,859,000$ | $1.81 \%$ |
| Gas Processing Plants | - | $0.00 \%$ |
| Total Washington Odorized | $\mathbf{2 6 , 8 5 9 , 0 0 0}$ | $\mathbf{0 . 3 1 \%}$ |

A. 51 Odorized Propane's Impact on West Virginia Economy
2018 Odorized Propane Sales Breakout


| Total Market Value of Odorized Propane <br> Sold in West Virginia (\$1,000) | $\mathbf{\$ 8 1 , 7 0 4}$ |
| :--- | ---: |
| Supply |  |
| Transportation, Storage, and Wholesale | $\$ 227,570$ |
| Retail | $\$ 29,066$ |


| Total Direct Value Added in West | $\mathbf{\$ 3 9 8 , 6 9 0}$ |
| :--- | ---: |
| Virginia | $\$ 722,352$ |
| Indirect and Induced | $\mathbf{\$ 1 , 1 2 1 , 0 4 1}$ |
| Total Odorized Propane Industry |  |
| Contribution to West Virginia GDP |  |


| 2018 Labor Income |  |
| :--- | ---: |
|  | $(\$ 1,000)$ |
|  | $\$ 58,593$ |
| Production | $\$ 9,087$ |
| Transportation, Storage, and Wholesale | $\$ 7,047$ |
| Retail |  |
| Direct Labor Income in West Virginia | $\$ 74,727$ |
| Odorized Propane Industry |  |

## A. 52 Odorized Propane's Impact on Wisconsin Economy



2018 Contribution to State Economy
Total Market Value of Odorized Propane $\$ \mathbf{\$ 7 0 3 , 1 6 6}$
Sold in Wisconsin $(\$ 1,000)$ Sold in Wisconsin $(\$ 1,000)$

| Supply | $\$ 0$ |
| :--- | ---: |
| Transportation, Storage, and Wholesale | $\$ 35,125$ |
| Retail | $\$ 694,988$ |


| Total Direct Value Added in Wisconsin | $\mathbf{\$ 7 3 0 , 1 1 3}$ |
| :--- | ---: |
| Indirect and Induced | $\$ 1,269,037$ |
| Total Odorized Propane Industry | $\mathbf{\$ 1 , 9 9 9 , 1 4 9}$ |
| Contribution to Wisconsin GDP |  |


| 2018 Labor Income |  |
| :--- | ---: |
|  | $(\$ 1,000)$ |
|  | $\$ 3$ |
| Production | $\$ 2,645$ |
| Transportation, Storage, and Wholesale | $\$ 71,937$ |
| Retail | $\$ 74,585$ |
| Direct Labor Income in Wisconsin |  |
| Odorized Propane Industry |  |

## 2018 Odorized Propane Production

|  | (Gallons) | (\% of U.S. <br> Total) |
| :--- | :---: | :---: |
| Refineries |  |  |
| Gas Processing Plants | 284,000 | $0.02 \%$ |
| Total Wisconsin Odorized | - | $0.00 \%$ |
| Propane Production | 284,000 | $\mathbf{0 . 0 0 \%}$ |

A. 53 Odorized Propane's Impact on Wyoming Economy

| 2018 Odorized Propane Sales Breakout |  |  |
| :---: | :---: | :---: |
|  | (Galons) | (\% of State) |
| Residential | 34,880,791 | 59.9\% |
| Commercial | 10,271,625 | 17.6\% |
| Cylinder | 934,983 | 1.6\% |
| Internal Combustion | 227,000 | 0.4\% |
| Industrial | 10,689,000 | 18.4\% |
| Agricultural | 1,193,000 | 2.0\% |
| Total Wyoming Odorized |  |  |
| Propane Demand | 58,196,399 | 100.0\% |
| Total Propane-Heated | 22,466 |  |
| Households |  |  |
| Propane Share of Wyoming Home Heating |  | 9.76\% |

2018 Contribution to State Economy
Total Market Value of Odorized Propane $\quad \$ 107,037$
Sold in Wyoming $(\$ 1,000)$ Sold in Wyoming $(\$ 1,000)$
$\begin{array}{lr}\text { Supply } & \$ 17,670 \\ \text { Transportation, Storage, and Wholesale } & \$ 6,914\end{array}$
Retail \$52,131

|  |  |  |
| :--- | ---: | ---: |
| Total Direct Value Added in Wyoming | $\mathbf{\$ 7 6 , 7 1 5}$ |  |
| Indirect and Induced | $\$ 279,488$ |  |
| Total Odorized Propane Industry | $\$ 356,203$ |  |
| Contribution to Wyoming GDP |  |  |


| 2018 Labor Income |  |
| :--- | ---: |
|  | $(\$ 1,000)$ |
|  | $\$ 14,148$ |
| Production | $\$ 1,012$ |
| Transportation, Storage, and Wholesale | $\$ 13,682$ |
| Retail | $\mathbf{\$ 2 8 , 8 4 2}$ |
| Direct Labor Income in Wyoming <br> Odorized Propane Industry |  |

2018 Odorized Propane Production

|  | (Gallons) | (\% of U.S. <br> Total) |
| :--- | ---: | ---: |
|  | $5,634,000$ | $0.38 \%$ |
| Refineries | 645,000 | $0.01 \%$ |
| Gas Processing Plants | $\mathbf{6 , 2 7 9 , 0 0 0}$ | $\mathbf{0 . 0 7 \%}$ |
| Total Wyoming Odorized |  |  |

## B.Residential Sector, By State and Division

ICF's estimates of county-level households and primary space heating fuels are based on the U.S. Census Bureau's 2018 American Community Survey (ACS). The ACS survey is performed annually.

Table 20 and Table 21 below present the U.S. Census Bureau's estimates for household heating fuel by state and census division. Census Bureau's definition of "Heating Fuels", while mostly self-explanatory, does come with the caveat that utility gas, though primarily natural gas (methane), may also include a small number of households which receive odorized propane through underground pipes. These housing units include single and multi-family site-built units, as well as manufactured homes, boats, mobile homes, and any other dwelling unit that serves as a primary residence.

In addition, because the purpose of the survey is to determine the primary household heating fuel, numbers in the tables may understate the prevalence of certain fuels for secondary space heating, which in some part of the country constitute a large portion of total energy used for space heating.

Table 20: 2018 Residential Households Primary Space Heating Fuels by Division

| State | Total Households in Region | Natural Gas | Propane | Electricity | Distillate ${ }^{37}$ | Wood | Other/None ${ }^{38}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| New England | 5,771,850 | 2,303,697 | 356,683 | 814,698 | 2,021,516 | 187,415 | 87,841 |
| Middle Atlantic | 15,687,513 | 9,425,486 | 601,426 | 2,526,892 | 2,525,626 | 260,338 | 347,745 |
| East North Central | 18,478,906 | 12,929,758 | 1,239,183 | 3,534,674 | 200,896 | 335,688 | 238,707 |
| West North Central | 8,460,833 | 4,913,507 | 864,069 | 2,334,501 | 67,463 | 169,380 | 111,913 |
| South Atlantic | 24,333,132 | 5,881,325 | 858,263 | 16,534,190 | 529,664 | 247,670 | 282,020 |
| East South Central | 7,299,667 | 2,295,201 | 426,720 | 4,392,645 | 30,097 | 110,884 | 44,120 |
| West South Central | 14,154,960 | 5,232,100 | 489,662 | 8,228,955 | 14,822 | 97,456 | 91,965 |
| Mountain | 9,015,792 | 5,031,998 | 392,388 | 3,168,967 | 27,599 | 259,795 | 135,045 |
| Pacific | 18,317,527 | 10,094,826 | 556,693 | 6,129,306 | 181,585 | 405,578 | 949,539 |
| Total U.S. | 121,520,180 | 58,107,898 | 5,785,087 | 47,664,828 | 5,599,268 | 2,074,204 | 2,288,895 |

[^17]Impact of the U.S. Consumer Propane Industry on U.S. and State Economies in 2018
Table 21: 2018 Residential Households Primary Space Heating Fuels (1)

| State | Total Households in State | Natural Gas | Propane | Electricity | Distillate | Wood | Other/None |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Alabama | 1,855,184 | 502,864 | 104,577 | 1,218,383 | 2,525 | 15,891 | 10,944 |
| Alaska | 254,551 | 122,020 | 5,640 | 34,656 | 73,236 | 12,918 | 6,081 |
| Arizona | 2,614,298 | 858,830 | 74,563 | 1,578,580 | 2,817 | 51,457 | 48,051 |
| Arkansas | 1,156,347 | 427,676 | 82,510 | 598,185 | 1,607 | 39,943 | 6,426 |
| California | 13,072,122 | 8,342,368 | 426,163 | 3,496,270 | 33,503 | 182,905 | 590,913 |
| Colorado | 2,176,757 | 1,502,352 | 103,320 | 503,980 | 2,500 | 34,473 | 30,132 |
| Connecticut | 1,378,091 | 497,422 | 60,526 | 232,420 | 549,036 | 22,954 | 15,733 |
| Delaware | 367,671 | 157,776 | 37,299 | 122,903 | 42,215 | 2,904 | 4,574 |
| District of Columbia | 287,476 | 146,306 | 3,024 | 129,222 | 2,581 | 0 | 6,343 |
| Florida | 7,809,358 | 365,966 | 63,395 | 7,210,000 | 11,959 | 10,182 | 147,856 |
| Georgia | 3,803,012 | 1,473,926 | 173,300 | 2,101,878 | 7,125 | 25,156 | 21,627 |
| Hawaii | 455,309 | 11,004 | 7,370 | 134,854 | 215 | 1,301 | 300,565 |
| Idaho | 640,270 | 334,824 | 31,162 | 212,296 | 10,065 | 44,366 | 7,557 |
| Illinois | 4,864,864 | 3,738,735 | 201,831 | 841,843 | 5,481 | 19,248 | 57,726 |
| Indiana | 2,599,169 | 1,548,536 | 184,265 | 777,784 | 16,551 | 47,601 | 24,432 |
| lowa | 1,267,873 | 779,024 | 165,484 | 286,768 | 6,203 | 14,855 | 15,539 |
| Kansas | 1,133,408 | 733,557 | 89,272 | 283,269 | 2,777 | 16,680 | 7,853 |
| Kentucky | 1,732,713 | 636,965 | 110,523 | 911,907 | 14,000 | 43,532 | 15,786 |
| Louisiana | 1,737,220 | 572,612 | 30,367 | 1,118,248 | 1,084 | 7,104 | 7,805 |
| Maine | 570,307 | 44,328 | 61,194 | 41,759 | 355,904 | 54,843 | 12,279 |
| Maryland | 2,215,935 | 956,824 | 80,754 | 944,809 | 176,897 | 26,454 | 30,197 |
| Massachusetts | 2,624,294 | 1,374,460 | 92,227 | 434,646 | 657,583 | 28,621 | 36,757 |
| Michigan | 3,957,466 | 3,009,520 | 332,085 | 407,077 | 40,558 | 110,656 | 57,570 |
| Minnesota | 2,194,452 | 1,431,179 | 237,190 | 397,513 | 37,345 | 43,772 | 47,453 |
| Mississippi | 1,108,630 | 329,840 | 123,545 | 634,392 | 3,171 | 12,482 | 5,200 |
| Missouri | 2,434,806 | 1,218,643 | 213,759 | 902,139 | 4,966 | 77,808 | 17,491 |
| Montana | 431,421 | 225,236 | 56,685 | 105,015 | 3,734 | 34,624 | 6,127 |
| Nebraska | 765,490 | 460,086 | 58,072 | 226,898 | 3,114 | 8,610 | 8,710 |
| Nevada | 1,129,810 | 646,974 | 26,003 | 417,183 | 5,834 | 17,336 | 16,480 |
| New Hampshire | 531,212 | 113,986 | 86,695 | 50,260 | 232,152 | 35,632 | 12,487 |
| New Jersey | 3,249,567 | 2,435,183 | 67,930 | 437,888 | 258,889 | 12,069 | 37,608 |
| New Mexico | 794,093 | 501,370 | 57,254 | 165,963 | 1,081 | 53,840 | 14,585 |
| New York | 7,367,015 | 4,397,917 | 308,020 | 890,554 | 1,459,976 | 120,159 | 190,389 |
| North Carolina | 4,011,462 | 992,077 | 268,167 | 2,552,432 | 111,718 | 62,478 | 24,590 |

Source: US Census American Community Survey

Impact of the U.S. Consumer Propane Industry on U.S. and State Economies in 2018
Table 22: 2018 Residential Households Primary Space Heating Fuels (2)

| State | Total <br> Households in <br> State | Natural Gas | Propane | Electricity | Distillate | Wood | Other/None |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| North Dakota | $\mathbf{3 1 9 , 3 5 5}$ | 129,563 | 45,025 | 128,042 | 7,346 | 1,240 | 8,139 |
| Ohio | $\mathbf{4 , 6 8 5 , 4 4 7}$ | $3,067,626$ | 244,785 | $1,137,973$ | 93,915 | 78,335 | 62,813 |
| Oklahoma | $\mathbf{1 , 4 8 5 , 3 1 0}$ | 759,085 | 100,674 | 584,523 | 3,353 | 22,935 | 14,740 |
| Oregon | $\mathbf{1 , 6 3 9 , 9 7 0}$ | 617,243 | 26,707 | 845,916 | 28,320 | 100,126 | 21,658 |
| Pennsylvania | $\mathbf{5 , 0 7 0 , 9 3 1}$ | $2,592,386$ | 225,476 | $1,198,450$ | 806,761 | 128,110 | 119,748 |
| Rhode Island | $\mathbf{4 0 6 , 5 7 3}$ | 226,173 | 11,618 | 41,491 | 117,880 | 4,634 | 4,777 |
| South Carolina | $\mathbf{1 , 9 2 7 , 9 9 1}$ | 438,188 | 67,015 | $1,382,708$ | 15,078 | 13,882 | 11,120 |
| South Dakota | $\mathbf{3 4 5 , 4 4 9}$ | 161,455 | 55,267 | 109,872 | 5,712 | 6,415 | 6,728 |
| Tennessee | $\mathbf{2 , 6 0 3 , 1 4 0}$ | 825,532 | 88,075 | $1,627,963$ | 10,401 | 38,979 | 12,190 |
| Texas | $\mathbf{9 , 7 7 6 , 0 8 3}$ | $3,472,727$ | 276,111 | $5,927,999$ | 8,778 | 27,474 | 62,994 |
| Utah | $\mathbf{9 9 8 , 8 9 1}$ | 820,514 | 20,935 | 134,529 | 1,034 | 12,921 | 8,958 |
| Vermont | $\mathbf{2 6 1 , 3 7 3}$ | 47,328 | 44,423 | 14,122 | 108,961 | 40,731 | 5,808 |
| Virginia | $\mathbf{3 , 1 7 5 , 5 2 4}$ | $1,054,657$ | 131,055 | $1,757,556$ | 139,770 | 66,813 | 25,673 |
| Washington | $\mathbf{2 , 8 9 5 , 5 7 5}$ | $1,002,191$ | 90,813 | $1,617,610$ | 46,311 | 108,328 | 30,322 |
| West Virginia | $\mathbf{7 3 4 , 7 0 3}$ | 295,605 | 34,254 | 332,682 | 22,321 | 39,801 | 10,040 |
| Wisconsin | $\mathbf{2 , 3 7 1 , 9 6 0}$ | $1,565,341$ | 276,217 | 369,997 | 44,391 | 79,848 | 36,166 |
| Wyoming | $\mathbf{2 3 0 , 2 5 2}$ | 141,898 | 22,466 | 51,421 | 534 | 10,778 | 3,155 |
| U.S. Total | $\mathbf{1 2 1 , 5 2 0 , 1 8 0}$ | $\mathbf{5 8 , 1 0 7 , 8 9 8}$ | $\mathbf{5 , 7 8 5 , 0 8 7}$ | $\mathbf{4 7 , 6 6 4 , 8 2 8}$ | $\mathbf{5 , 5 9 9 , 2 6 8}$ | $\mathbf{2 , 0 7 4 , 2 0 4}$ | $\mathbf{2 , 2 8 8 , 8 9 5}$ |
| Source US Census | American | Comity | Survel |  |  |  |  |

Source: US Census American Community Survey

# C.Appendix: NAICS Codes and Definitions 

Table 23. NAICS Codes and Definitions

| Industry | NAICS Code | Description |
| :---: | :---: | :---: |
| Crude Petroleum and Natural Gas Extraction | 211111 | Engaged in (1) the exploration, development, and/or the production of petroleum from wells in which the hydrocarbons will initially flow or can be produced using normal or enhanced drilling and extraction techniques or (2) the production of crude petroleum from surface shales or tar sands or from reservoirs in which the hydrocarbons are semisolids. |
| Natural Gas Liquid Extraction | 211112 | Engaged in drilling oil and gas wells for others on a contract or fee basis. This industry includes contractors that specialize in spudding in, drilling in, redrilling, and directional drilling. |
| Drilling Oil \& Gas Wells | 213111 | Engaged in drilling oil and gas wells for others on a contract or fee basis. |
| Support Activities for Oil and Gas Operations | 213112 | Engaged in performing support activities on a contract or fee basis for oil and gas operations (except site preparation and related construction activities). Services included are exploration (except geophysical surveying and mapping); excavating slush pits and cellars, well surveying; running, cutting, and pulling casings, tubes, and rods; cementing wells, shooting wells; perforating well casings; acidizing and chemically treating wells; and cleaning out, bailing, and swabbing wells. |
| Petroleum Refineries | 32411 | Engaged in refining crude petroleum into refined petroleum. Petroleum refining involves one or more of the following activities: (1) fractionation; (2) straight distillation of crude oil; and (3) cracking. |
| Crude Pipelines | 4861 | Primarily engaged in the pipeline transportation of crude oil. |
| Refined Petroleum Product Pipelines | 48691 | Engaged in the pipeline transportation of refined petroleum products. |
| Natural Gas Pipelines | 4862 | Primarily engaged in the pipeline transportation of natural gas from processing plants to local distribution systems. This industry includes the storage of natural gas because the storage is usually done by the pipeline establishment and because a pipeline is inherently a network in which all the nodes are interdependent. |
| Wholesale Petroleum Trade | 4247 | Primarily engaged in the merchant wholesale distribution of petroleum and petroleum products, including liquefied petroleum gas. |
| Petroleum Bulk Stations and Terminals | 424710 | Establishments with bulk liquid storage facilities primarily engaged in the merchant wholesale distribution of crude petroleum and petroleum products, including liquefied petroleum gas |
| Petroleum and Petroleum Products Merchant Wholesalers (except Bulk Stations and Terminals) | 424720 | Establishments primarily engaged in the merchant wholesale distribution of petroleum and petroleum products (except from bulk liquid storage facilities). |
| Gasoline Stations | 447 | Industries in the Gasoline Stations subsector retail automotive fuels (e.g., gasoline, diesel fuel, gasohol, alternative fuels) and automotive oils or retail these products in combination with convenience store items. These establishments have specialized equipment for storing and dispensing automotive fuels. |
| Fuel Dealers | 45431 | Primarily engaged in retailing heating oil, liquefied petroleum (LP) gas, and other fuels via direct selling. |
| Heating Oil Dealers | 454311 | Primarily engaged in retailing heating oil via direct selling. This NAICS code was merged into 454310 (see above) in the second half of 2011. |
| LPG Dealers ${ }^{39}$ | 454312 | Engaged in retailing liquefied petroleum (LP) gas via direct selling. This NAICS code was merged into 454310 (see above) in the second half of 2011. |

Source: U.S. Census 2012, 2017 \& 2019 NAICS Manuals

[^18]
## D.Appendix: Acronyms

| API | American Petroleum Institute |
| :---: | :---: |
| BEA | Bureau of Economic Analysis (U.S. Department of Commerce) |
| BLS | Bureau of Labor Statistics (U.S. Department of Labor) |
| EIA | Energy Information Administration (U.S. Department of Energy) |
| LNG | Liquefied Natural Gas |
| LPG | Liquefied Petroleum Gas |
| LRG | Liquefied Refinery Gas |
| NAICS | North American Industry Classification System is the standard used by Federal statistical agencies in classifying business establishments for the purpose of collecting, analyzing, and publishing statistical data related to the U.S. business economy. |
| NEB | National Energy Board (Canada) |
| $N G L$ | Natural Gas Liquid |
| NPGA | National Propane Gas Association |
| PADD | Petroleum Administration for Defense Districts <br> PADD 1 (East Coast) is composed of the following three sub-districts: <br> 1A (New England): Connecticut, Maine, Massachusetts, New <br> Hampshire, Rhode Island, Vermont. <br> 1B (Central Atlantic): Delaware, District of Columbia, Maryland, New Jersey, New York, Pennsylvania. <br> 1C (Lower Atlantic): Florida, Georgia, North Carolina, South Carolina, Virginia, West Virginia. <br> PADD 2 (Midwest): Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Missouri, Nebraska, North Dakota, South Dakota, Ohio, Oklahoma, Tennessee, Wisconsin. <br> PADD 3 (Gulf Coast): Alabama, Arkansas, Louisiana, Mississippi, New Mexico, Texas. <br> PADD 4 (Rocky Mountain): Colorado, Idaho, Montana, Utah, Wyoming. PADD5 (West Coast): Alaska, Arizona, California, Hawaii, Nevada, Oregon, Washington. |
| PERC | Propane Education and Research Council |
| QCEW | Quarterly Census of Employment and Wages (performed by the BLS) |
| RACC | Refiner Acquisition Cost of Crude |
| WTI | West Texas Intermediate crude, a futures contract traded on the New York Mercantile Exchange (NYMEX), is a blend of several U.S. domestic streams of light sweet crude oil. For WTI crude oil, the delivery point is Cushing, Oklahoma. |

## E. Appendix: Major Public Data Sources

1) 2015 Residential Energy Consumption Survey, Energy Information Administration
2) 2018 American Community Survey, U.S. Census Bureau
3) 2018 Petroleum Supply Annual, Energy Information Administration
4) 2018 Petroleum Marketing Annual, Energy Information Administration
5) 2018 Natural Gas Annual, Energy Information Administration
6) 2018 Annual Retail Propane Sales Report, ICF, January 2020
7) Interactive Tariff and Trade DataWab, United States International Trade Commission
8) Bloomberg, various pricing reports and financial data
9) Monthly Natural Gas Liquids Report, Energy Information Administration
10) Natural Gas Liquids Statistics, National Energy Board of Canada
11) Quarterly Census of Employment and Wages, Bureau of Labor Statistics
12) Natural Gas Processing Capacity (2012 \& 2014 \& 2016), Energy Information Administration 757 Survey
13) State Energy Data Systems, Consumption \& Expenditures Data, Energy Information Administration


[^0]:    ${ }^{1}$ American Community Survey 2018 1-year estimates, U.S. Census Bureau, Washington, DC, December 2019.
    ${ }^{2}$ Estimate based on data from the Residential Energy Consumption Survey (2015), Energy Information Administration, Washington, DC, October 2019.
    ${ }^{3} 2018$ Retail Propane Sales Report, ICF and the Propane Education and Research Council, Washington, DC January 2020.
    ${ }^{4}$ Statistical Review of Global LPG 2018, Argus Media, http://www.argusmedia.com, November 2019.
    ${ }^{5}$ Ibid
    ${ }^{6}$ Eric Kuhle, Michael Sloan, 2015 Study of the Propane Industry's Impact on U.S. and State Economics, ICF.

[^1]:    ${ }^{7}$ There are minor methodology and demand categorization issues of sectoral propane demand from 2015 to 2018 that may impact annual comparisons.
    ${ }^{8}$ As defined by the National Oceanic and Atmospheric Administration (NOAA), a heating degree day (HDD) is "a quantitative index demonstrated to reflect demand for energy to heat... houses and businesses. Heating degree days are summations of negative differences between the mean daily temperature and the $65^{\circ} \mathrm{F}$ base; .... For more information, see NOAA's explanation page at http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/cdus/degree_days/ddayexp.shtml

[^2]:    ${ }^{9}$ The Petroleum Administration for Defense Districts (PADDs) are geographic aggregations of the 50 States and the District of Columbia into five districts: PADD 1 is the East Coast, PADD 2 the Midwest, PADD 3 the Gulf Coast, PADD 4 the Rocky Mountain Region, and PADD 5 the West Coast. Due to its large population, PADD 1 is further divided into sub-PADDs, with PADD 1A as New England, PADD 1B the Central Atlantic States, and PADD 1C comprising the Lower Atlantic States. (Energy Information Administration, available at: http://www.eia.gov/todayinenergy/detail.cfm?id=4890)
    ${ }^{10}$ Refining Districts are PADD sub-regions, also defined by the Department of Energy. For a detailed description of refining districts, see: http://www.eia.gov/petroleum/supply/monthly/pdf/append.pdf
    ${ }^{11}$ Natural Gas Liquids purity products include Ethane, Ethylene, Propane, Propylene, Normal Butane, IsoButane, Butylene, and Pentanes Plus.

[^3]:    ${ }^{12}$ Consumer Price Index - Chained Consumer Price Index, Series Id: SUUR0000SAO, Bureau of Labor Statistics, Washington, DC. Available at: http://www.bls.gov/cpi/data.htm

[^4]:    ${ }^{13} \mathrm{https}: / / w w w . b e a . g o v / d a t a / e m p l o y m e n t / e m p l o y m e n t-b y-i n d u s t r y ~$
    14 The job impact of imported appliances and engines does not include the direct manufacturing activities but does include the distribution and installation of the propane equipment.

[^5]:    ${ }^{15} 2018$ Retail Propane Sales Report, ICF and the Propane Education \& Research Council, January 2020

[^6]:    ${ }^{16}$ The Propane Database and Forecast Model (PDFM) is a proprietary model that ICF utilizes to forecast all sectors of the U.S. retail propane sector, including Residential, Commercial, and Industrial, Agricultural, Resell, and Internal combustion demand. The PDFM utilizes multiple data sources and regressions to forecast annual and monthly propane consumption based on a variety of forecast metrics, including economic growth, weather, energy efficiency, economic growth, housing trends, and the adoption of propane engines across multiple uses.
    ${ }^{17}$ The EIA suspended publishing retail propane prices (Residential, Commercial, etc) by state in 2011. ICF has utilized historic relationships between sectors, Mont Belvieu wholesale propane prices, winter residential propane prices from EIA's State Heating Oil and Propane Price (SHOPP) state and regional Rack propane prices to estimate retail propane prices by sector and state.

[^7]:    ${ }^{18}$ Not all companies choose to participate in the LP Gas Magazine survey.
    ${ }^{19}$ The Master Limited Partnership category includes Amerigas Propane, Ferrellgas Partners LP, and Suburban Propane.

[^8]:    ${ }^{20}$ This analysis of 2018 spending includes AmeriGas Propane, Suburban Propane, Ferrellgas Partners, the retail propane business of NGL Energy Partners, and the U.S. subsidiary of Superior Plus Corp.

[^9]:    ${ }^{21}$ https://www.census.gov/construction/nrc/index.html
    22 https://www.census.gov/data/tables/time-series/econ/mhs/shipments.html

[^10]:    ${ }^{23}$ Gaseous fuels include propane, butane, and natural gas

[^11]:    ${ }^{24} \mathrm{https}: / / w w w . e i a . g o v / c o n s u m p t i o n / c o m m e r c i a l / ~$
    ${ }^{25}$ https://www.eia.gov/consumption/commercial/ - Information from the surveys conducted in 2012 and 2003 has been used in this analysis. Information from the Commercial survey conducted in 2018 will not be available until late 2020.

[^12]:    ${ }^{26}$ https://www.wlpga.org/wp-content/uploads/2019/12/WLPGA-Annual-Report-2019.pdf \& https://www.wlpga.org/wp-content/uploads/2019/04/A-Global-Roadmap-for-Autogas-December-2019.pdf
    ${ }^{27}$ This estimate includes light duty vehicles using propane, or LPG, fuels, school buses, and other medium duty vehicles used in various fleet operations. This estimate does not include forklifts or other off-road propane fueled vehicles.
    ${ }^{28}$ The AFDC provides statistics and information on alternative fuel use across the U.S., including biodiesel, electricity, natural gas, hydrogen, ethanol, and propane - https://afdc.energy.gov/

[^13]:    $29 \mathrm{https}: / / p r o p a n e . c o m / f o r-m y-b u s i n e s s / f l e e t-v e h i c l e s / p r o p a n e-a u t o g a s-r e f u e l i n g-~$ options/\#/find/nearest?fuel=LPG\&lpg secondary=true\&country=US
    ${ }^{30}$ https://files.schoolbusfleet.com/stats/SBF-StateTransportationStats2017-18.pdf

[^14]:    ${ }^{31} \mathrm{https}: / /$ www.blue-bird.com/alternative-fuels
    32 https://thomasbuiltbuses.com/

[^15]:    ${ }^{33}$ https://machinemaxxusa.com/2018-annual-forklift-report/

[^16]:    34
    https://www.nass.usda.gov/Publications/AgCensus/2017/Online Resources/Farm and Ranch Irrigation Sur vey/fris.pdf
    ${ }^{35}$ The USDA's 2013 Farm and Ranch Irrigation Survey reported there were 13,444 irrigation pumps were powered by propane, up slightly from the 12,203 propane powered pumps in 2008.
    ${ }^{36} \mathrm{https}: / /$ propane.com/propane-products/commercial-mowers/

[^17]:    ${ }^{37}$ Distillate includes Fuel Oil and Diesel Home Heated Households ${ }^{38}$ Includes Coal, Solar, Other, and No Fuel Households,

[^18]:    ${ }^{39}$ The North American Industry Classification System (NAICS) suspended separate reporting of economic activity in the LPG Dealers (454312) and Heating Oil Dealers (454311) classifications starting in the $2^{\text {nd }}$ quarter of 2011, merging both into the Fuel Dealers (45431) classification. 2012 employment figures are estimates derived from total 45431 reported data using historical trends in LPG Dealers and Heating Oil Dealers share of total Fuel Dealers, total number of gallons sold and customers served, state-level relationships between customer and employee numbers, and state-level economic conditions.

